Specialized Oil Publications of
THE GULF PUBLISHING COMPANY

The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipeline industry

PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

THE OIL WEEKLY

ENGINEERING « NEWS » STATISTICS

Published by THE GULF PUBLISHING COMPANY, Houston, Texas

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LOOKING AHEAD
... with the Editor

THE fact that there were 30 serious blowouts in the Gulf Coast of Louisiana and Texas during 1943 is sufficient cause for reviewing the situation and for bringing concerted effort to bear in an attempt to reduce this physical and economic loss.

In addition to discussing various blowout causes and their prevention, a forthcoming two-part article will recommend that much can be accomplished by reporting details of each blowout to a central technical group, which could disseminate new ideas and methods throughout the industry. Use of posters as the basis for a comprehensive education program, which would call attention of workmen to the various hazards and explain why certain things are bad practice is included in the recommendations.

THE OIL MAN'S CALENDAR

OCT. 3–4	American Association of Oil Well Drilling Contractors, Blackstone Hotel, Fort Worth.
12–13	Texas Mid-Continent Oil & Gas Association, Houston.
23–25	Fifteenth Annual Meeting, IPA, Dallas, Texas.
NOV. 13–16	American Petroleum Institute, Stevens Hotel, Chicago.

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Published Every Monday. Single Copies 15 cents (Except Special Issues). Subscription price: domestic and foreign, $2.00 a year; 2 years, $3.00. Advertising rates on application.

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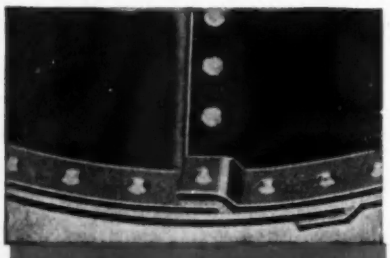
U. S. Army Learns How Easily and Speedily Maloney Bolted Steel Tanks Can Be Erected and Dismantled

Photograph courtesy of U. S. Army Signal Corp



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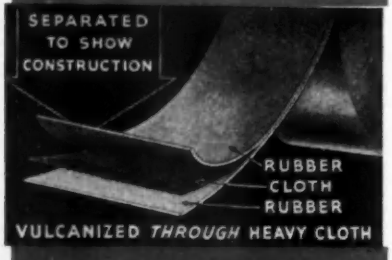

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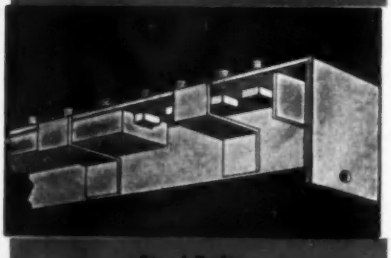
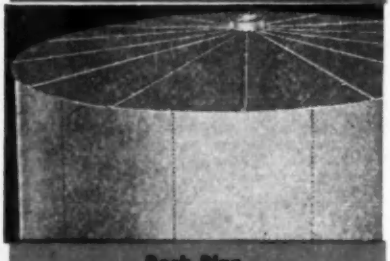


Steel Rafters



Deck Plan

The features which have made Maloney tanks a favorite in the oil industry are aiding in the war effort. Above is a photograph showing Maloney tanks at an army training center.

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The Changing Panorama

Oil Treatment That Traps Germs

HAILED as a major advance in blocking the spread of respiratory ills, is a new oil treatment of infected areas or areas that might become infected. An odorless, greaseless, non-sticky oil treatment for floors, blankets and bedding that traps germs in hospitals and barracks has been developed in research carried out by medical scientists for the office of the surgeon general of the Army. This oil treatment holds the bacteria and viruses of infectious diseases so tightly that they cannot spread into the air. The oil film holds bacteria as tightly as flypaper traps a fly.

Tests at Camp Carson, Colorado, and neighboring Peterson Field covering 16,000 men indicate respiratory ailments can be reduced 28 percent by keeping all floors of barracks oiled and soldiers' blankets impregnated with the oil film. Actual counts of bacteria floating in the air showed even more remarkable declines. In hospital wards, oiling the floors cuts air-borne bacterial counts from 460 to 120 per cubic foot of air—a decrease of 74 percent. Giving the bed linen the oil treatment was even more effective. When this was done the bacterial counts were from 3500 to 350 per cubic foot of air—a drop of 90 percent. When both the floor and blankets were oiled, 97.2 percent of the bacteria that formerly floated through the barracks were trapped on the oil film.

Aside from this new use for oil, the discovery promises phenomenal results in helping control the spread of air-borne diseases. A single treatment with the oil is good for four months, and the cost is negligible.

Geophysical Search In The Southeast

AN INTENSIVE geophysical search for oil is taking place in southeastern United States, with a total of 74 crews of various types now active. The heaviest concentration is found in Mississippi, with 47 crews compared with 36 two months ago and 23 a year ago. Today 11 crews are operating in Alabama, 13 are in Florida, and 3 in Georgia, in contrast with 1 unit operating in each of the states a year ago.

British experiments with aluminum foil as heat-dissipating agent on emergency steel houses may help overcome the high summer temperatures encountered under conventional corrugated metal roofing of many oil-field offices and pump stations.

Civilian Gasoline Stocks Are Lower

ALTHOUGH current stocks of all types of gasoline in the United States are but 6 million barrels lower than comparable prewar gasoline stocks, inventories of motor gasoline for civilians are considerably smaller. Stocks of all gasoline totaled approximately 87 million barrels on June 10, 1944, in contrast with 93 million barrels on May 31, 1941.

However, PAW has announced that total stocks of motor gasoline held at refineries and terminals in the United States constituted but 47¾ million barrels of the 87 million barrels in storage on June 10 this year, comparable with national prewar motor gasoline stocks of 77¾ million barrels on May 31, 1941. Thus, while stocks of all grades of gasoline currently are but 6 million barrels under levels of three years ago, civilian grades are 30 million less.

Manpower Problems In Postwar Drilling

THE automotive and affiliated industries announce that they will absorb 10,000,000 workers the first year after the war provided that they are able to attain the estimated annual output rate of 6 million cars during that period. Against this figure the estimated increase of 15,000 men required for additional oil-drilling activities needed to bring annual completions above the 30,000 mark seems puny and easy to attain. But the drilling industry cannot draw, as will the automotive manufacturers, on a gigantic backlog of munitions-plant and other war workers already trained for tasks approximating their new jobs—and the drilling industry's contribution to postwar employment increase undoubtedly will be more difficult of attainment than the other. This will be true despite the fact that, job for job, exploration crews are even more indispensible to attainment of objectives than any like number of automobile craftsmen.

Lone Star State Is Production Star

TEXAS, whose daily rate of producing crude oil has risen from a prewar output of 1½ million barrels daily to slightly over 2 million barrels during the current month, alone is producing more oil than the world produced during World War I.

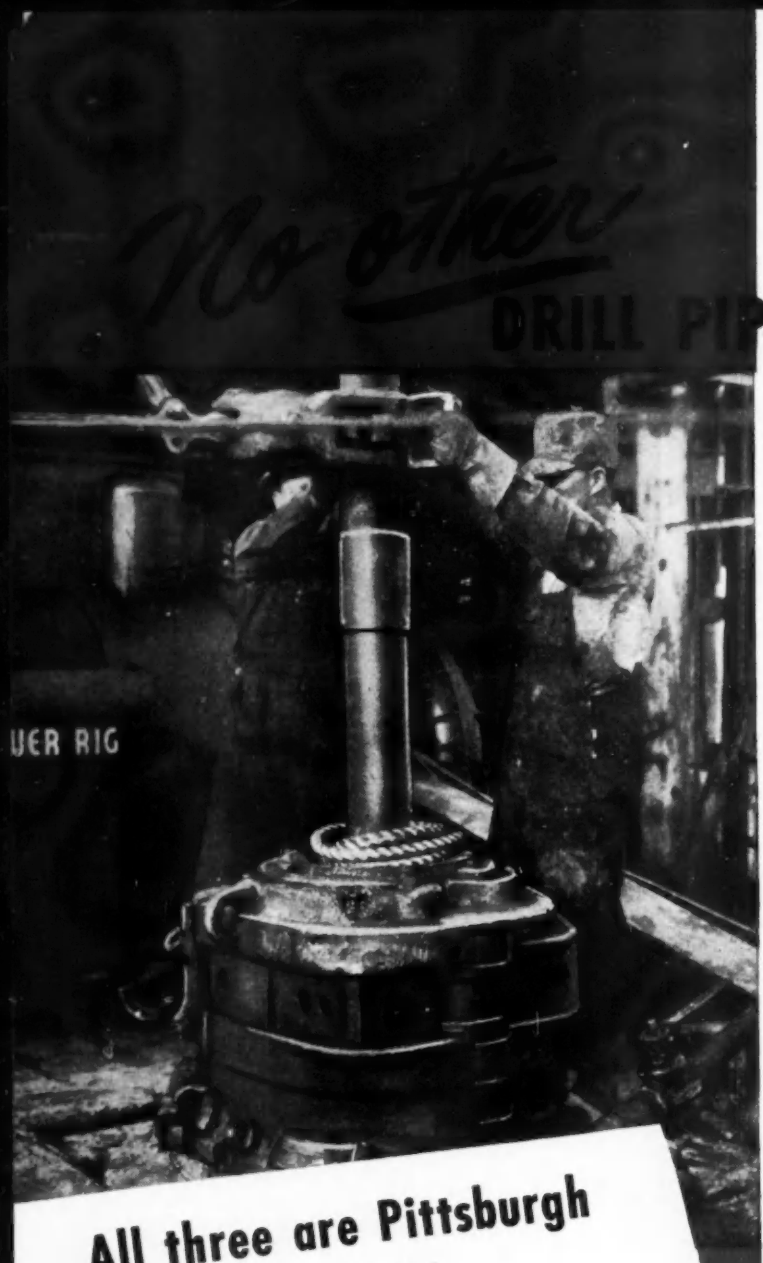
During the first six months of 1944 Texas will produce approximately 345 million barrels of crude oil, and during the coming six months is likely to produce another 375 million barrels, or a total of 720 million barrels during the year. World annual crude oil production amounted to but 500 million barrels for the years 1917 and 1918, and did not exceed 700 million barrels until 1921.

New College Course Available

OUR good Houston friend E. M. Biggers, who some time ago started out to compile a list of governmental alphabetical agencies and was advised by government authorities that months would be required to develop the list of them, can add another series of letters to his already astronomical list. The ESMWT (Emergency Science Management War Training) has been instituted by the JCTB (Joint Contract Termination Board) for the purpose of having governmental and management employes study the problems of contract termination. The idea is to get these people together and have them arrive at a common understanding of the factors which must be considered in terminating a war contract. The government will direct the training. The plan has been started at the University of Pennsylvania and may be expanded to about 50 institutions, according to an OWI bulletin.

The bulletin says that there are about 90,000 contractors and 10,000 governmental employes who may receive this training but it does not say how long the course would require.

This sizeable addition to American college life will afford post-graduate opportunities to many who have merely "been to college" while it will enable others to become, willy-nilly, college men or women, because, we assume, the effort will be co-educational. In view



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"	10,008′	4-1/2″	16.60 lb.
"	15,279′	3-1/2″	13.30 lb.

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Make	Grade	Depth	Size	Weight
Pittsburgh A.P.I.	J-55	1,940′	13 3/8″	54.5 lb.
" "	N-80	6,900′	8 5/8″	36 lb.

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Make	Depth (Feet)	Wt./Ft. Lbs.	Footage Run	Total Wt. of Section	Type of Joint
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" "	4,024-5,786	20	1762	35,240	Long Collar
" "	5,786-10,079	17	4293	72,981	Long Collar
" "	10,079-12,916	28	2837	56,740	Long Collar
" "	12,916-15,278	23	2362	54,326	Long Collar

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Thus has been *proved,* by actual *field performance,* all the plus-factors of superiority formerly attributed to Pittsburgh Oil Country Tubulars by engineering calculations alone. *Now* has been *demonstrated* beyond shadow of doubt that *Pittsburgh* excels in point of steel integrity, design and fabrication.

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of the fact that the manpower shortage also involves executives of management, we are a little perturbed about the effect of the enrollment on the ranks of industry, and we hope we will be forgiven if there should sneak into our mind the slight fear that maybe a part of the college atmosphere might be to condition the management scholars to an attitude of "what's the use?" Of course this fear is an unworthy one and attributes to our present administration a desire to use propaganda in whatever form, whereas no one should hold such silly ideas about the administration.

The bulletin said that the full training program would await action by Congress on legislation now pending for the settlement of war contracts since the final curriculum will depend upon that legislation. A bill has passed the senate and is before the house. It therefore must be assumed that the curriculum in use at the University of Pennsylvania is in the nature of a sort of prep course, or something like spring training for the football squad.

We were not asked about this idea, but if we had been, we would have suggested that if the bosses of the 10,000 governmental agents went to college and studied something about contracts themselves, much trouble might be avoided.

Civilian Gasoline And Oil Tank Cars

AN INCREASING number of oil tank cars are now being diverted from normal supply routes to replenish stocks used for the invasion, which means that distribution of civilian gasoline supplies may be disturbed somewhat.

Deputy Petroleum Administrator Ralph K. Davies has announced that during the "last few months tank-car movements under one branch of military service alone have increased 60 percent, and many more cars are being diverted from hauling civilian products to meeting military emergency requirements."

Another shift in tank-car use is to occur in July, when 30,000 barrels of West Texas crude oil is scheduled to start moving daily to California refineries. Hauling this much crude on a one-way 48-hour run is going to require a number of tank cars.

Perhaps a prolonged war is our only hope of learning in our very bones that if free peoples elect fools and shysters to mislead and hood-wink them, they and their children will pay the price in that all too familiar formula of "blood and sweat and tears."

—FLIGHT TO ENGLAND
by I. A. R. Wylie

Petroleum High in Lend-Lease Items

PETROLEUM products exported for lend-lease purposes from March, 1941 through February, 1944 amount to $743 million, as shown by the President's report on lend-lease operations for the period ending March 31, 1944. Total lend-lease aid amounted to $24,225,000,000 up to March 31.

Distributed by countries, these products in value were: United Kingdom, $518 million; U.S.S.R., $34 million; Africa, Middle East, and Mediterranean are, $65 million; China, India, Australia and New Zealand, $124 million; and other countries, $2 million.

Because the Soviet Union has not had sufficient refining capacity to meet the demands of this war for petroleum products, we have sent 840,000 tons of aviation gasoline, high-grade lubricating oils and other similar petroleum products needed by the Red Air Force and the Red Army. We have also shipped almost $50 million worth of petroleum refinery equipment to the Soviet Union. This is now being installed in the U.S.S.R. under the direction of American engineers. In the meantime Soviet engineers, technicians and operators have come to this country to study American refinery methods so that they can operate the plants in Russia.

Lend-lease and reverse lend-lease are not a system of debits and credits. They involve neither gifts, nor loans or transfers of money. They are, instead, a system of mutual war supply that has been evolved by the United Nations to make possible the effective combined operations by which we are fighting and winning the war.

Oil from Quarries If Tests Succeed

THE Bureau of Mines is tackling the problem of finding a commercially feasible method for recovering the millions of barrels of oil locked like water in a sponge in the sandstones of six California counties. If experiments are successful, quarries may supplement wells as an important source of crude oil. Unlike the oil shales of Colorado and other states where the removal of complex organic materials is necessary to obtain oil, the California rocks are saturated with a true petroleum similar to that taken from ordinary oil wells.

Oil already has been extracted by bureau chemists from rock obtained in the Edna area of San Luis Obispo County, but work has been limited to a laboratory-size test plant. Now attempts will be made to determine if it can be done commercially. In bureau tests, samples of San Luis Obispo rock have been moistened with a small quantity of gas oil, then heated to about 180 degrees F. and disintegrated. The oil was recovered by washing the sand in hot water to which a small amount of sodium silicate had been added. In experimental trials more than 95 percent of the oil content has been recovered. The resulting oil was black, sticky and heavy, but is capable of producing good gasoline when properly treated.

The California bituminous rocks are found principally near Santa Cruz in Santa Cruz County, in the vicinity of San Luis Obispo and other parts of San Luis Obispo County, in the Sisquoc district of Santa Barbara County, near Maricopa and McKittrick in western Kern County, and also in Ventura and Mendocino counties.

China Looks Toward Industrialization

RAPID industrialization of China following close of the war should open many new markets to American industry. Immense possibilities of vast areas beyond the Pacific should result in expansion of our Pacific coast ports and create general industrial activity on our western seaboard.

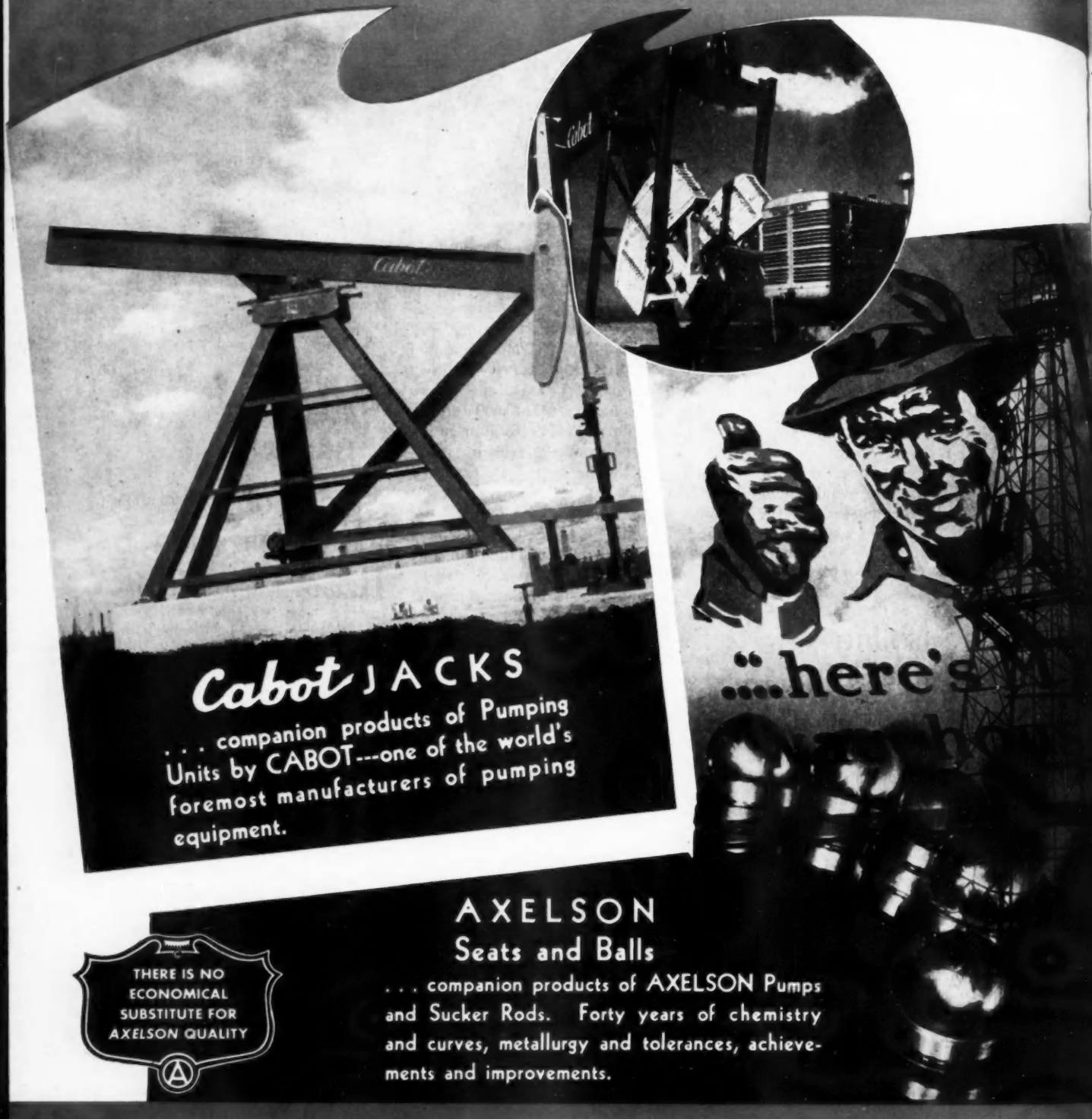
Speaking in Los Angeles, recently, G. W. Boissevain, newly appointed Consul General of the Netherlands, gave an optimistic picture of the West as a trade center for the Pacific basin.

China, herself, is already projecting postwar plans for greater manufacturing. Plans for automotive production have been announced by the Chinese minister of information and call for an initial annual output of approximately 2600 vehicles.

The first factory would be established during the first two postwar years and would produce nine types of vehicles including three kinds of passenger cars, one-ton station wagon, two-ton bus, three-ton truck, five-ton horse trailer and ten-ton trailer truck.

Durability and simplicity are planned for the early models with Diesel engines being used for economy and availability of fuel. It is proposed to decentralize the industry and technical laboratories will be provided for improvement of the industry. Foreign experts and raw materials would be employed and the managerial staff would be trained in foreign countries.

"Tell me thy company."



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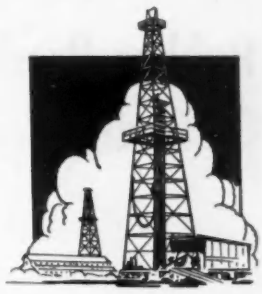


By BERTRAM F. LINZ, Washington Correspondent

An emergency call from the military for an immediate and substantial increase in the supply of 100-octane aviation gasoline last week received the concerted attention of Army, Navy, PAW and rubber office officials and the industry, resulting in orders from the rubber director for an immediate cut-back in synthetic rubber production to release 400,000 barrels of butylene, and a call upon refiners by PAW to push their aviation fuel production to the limit, followed by an Army-Navy-industry meeting in Washington at which the need for greater supplies was explained.

Invasion Needs Under-estimated — Better-than-anticipated weather and less-than-expected enemy air opposition which made possible greater use of planes than had been figured upon was given as one reason for the sudden need for more gasoline, but the basic cause of the Army's difficulties was said to have been under-estimation of the gasoline which would be consumed in the invasion of Normandy.

Reserves Cut Into—The situation does not threaten to halt or slow down the European assault, but the back-stopping reserves built up for the attack have been cut into seriously; nor does it, unless prolonged longer than now expected, offer any fears to civilian gasoline supplies, which were reported at a level where they will be adequate for ration requirements while military stocks are being replenished.

PAO-11 Revised—PAW announced removal of federal restrictions as to distance between wells and between wells and property lines but retained 40-acre spacing regulations. Other important changes affecting gas wells, pumping wells and materials also were included in the order issued June 30.

Moore Field Sale—Other developments in Washington during the week included: consideration by the Navy Department of sale of its Moore (Oklahoma) air field to the highest bidder, as a result of the refusal of the House to consider legislation asked by the late Secretary Frank Knox to resell the land, now in the midst of a new oil area, to the original owners for what they were paid for it, plus the money spent on it by the Navy.

Manpower Warning—A sharp warning was issued by PIWC Chairman William R. Boyd, Jr., that continued draining off of industry technical workers by the armed services threatens to impair the improvement and even the production of vital products.

P-98-B Revision—Revision of P-98-B by the War Production Board, on the recommendation of PAW, to reduce the paper works required of operators in obtaining materials was announced.

Elk Hills Development—The Navy plans to drill 300 wells in the Elk Hills reserve to increase daily production from 15,000 to 65,000 barrels under agreements consummated with Standard Oil Company of California.

PAO-11 Revisions Announced But 40-Acre Spacing Rule Is Retained

Results of Deputy Administrator Ralph K. Davies' trip to Texas last month were disclosed June 30 when PAW issued a revision of its POA-11.

A major feature of the change in policies was a supplementary order No. 12, applying to Arkansas, Louisiana, Mississippi, New Mexico and Texas removing the federal restrictions as to distance between wells and between wells and property lines, but requiring operators to conform with the state regulations.

Called Compromise

In the nature of a compromise between what the industry and the state authorities wanted and what PAW could concede without imperiling its position with WPB as a claimant agency, the order retained the 40-acre spacing requirement.

Restrictions on the reworking, deepening and recompletion into another pool were eased so that wells may be reworked under the same regulations as govern the drilling of new wells in the East Texas field, covering Upshur, Gregg, Smith, Rusk and Cherokee counties, pumping and other artificial lifting equipment may be installed on one well to every ten producible acres or on any well located on a lease where the Railroad Commission permits transfer of allowable oil production from one well to another well located on the same lease.

In the remainder of Texas and in the other four states, restrictions on the installation of pumping and other artificial lifting equipment are removed.

PAO-11 itself was revised in a number of respects, as follows:

Restrictions on the drilling of dry gas wells in effect since March 30, 1943, were modified to provide that a well may be drilled anywhere in the United States if it is the only drilling or producible on a unit consisting of 640 contiguous surface acres, except in areas designated in PAW orders as restricted. Such a well must be located at least 1320 feet from every lease property and subdivision line separating unconsolidated property interests, and must be at least 3960 feet from every other drilling or producible well. Previously such wells could be drilled only under supplementary order No. 1, covering the Appalachian area, Northeast Oklahoma, Eastern Kansas and Missouri.

Authentic authorization is granted for the use of materials for gathering lines to an amount not exceeding $10,000 for any one completion operation, as against the previous exception limit of $5000.

Automatic authorization also is granted for the use of materials for any gasoline recovery, gas treating, cycling and pressure maintenance operation up to a cost of $10,000.

Purchase Procedure Changed

Provisions which previously permitted the expenditure of up to $500 of materials for any gas or gasoline operation, even if the material had been obtained for maintenance and repair, have been removed and put under the revised P-98-B order.

Restrictions on the installation or reinstallation of pumping or other artificial lifting equipment have been removed except as specifically restricted by supplementary orders.

Restrictions also were removed to permit the reworking, redrilling or deepening of any gas or oil well and recompletion of the well within the pool to which it last produced.

Rubber Production Cut Back in Favor Of Badly Needed 100-Octane Gasoline

With the Army facing a serious shortage of 100-octane aviation gasoline which, unless checked, might threaten the air offensive over Europe and in the Pacific, Rubber Director Bradley Dewey last week ordered the July and August production of synthetic rubber from petroleum cut back in seven plants to release 400,000 barrels of butylene.

Dewey's action will cut the production of rubber by 30,000 tons but will provide an additional 1,000,000 barrels of gasoline, it was estimated.

The rubber director said this action will not in any way decrease the planned production of tires or other products, explaining that inventories of synthetic rubber have been built up to a high level while manpower shortages in rubber-goods plants is slowing its consumption The proposed move will not result in the building of one less tire, Dewey said.

The agreement to cut back synthetic rubber production was reached quickly and without argument between the War Department and the rubber director.

Reasons Are Cited

Action to provide more gasoline was asked by Undersecretary of War Robert P. Patterson who reported that "100-octane aviation gasoline is being consumed in unprecedented quantities, and despite the fact that high-octane production is on its current schedule, we are under the urgent necessity of stepping up shipments of this product to the fighting forces overseas.

"This is because of summer flying weather and targets now within reach," Patterson explained.

All of the butylene to be diverted from the rubber program will be used before September 1, when petroleum plants will go back on regular schedule.

At the present time, 60 percent of the synthetic rubber production is from alcohol and 40 percent from petroleum. During July and August, the proportions will be 70 percent from alcohol and 30 percent from oil, and thereafter the rubber program calls for only 45 percent from alcohol and the remaining 55 percent from petroleum.

During the next two months plants making butadiene will be stepped up greatly, but Dewey said this action will not materially affect the industrial-alcohol situation.

The rubber plants to be affected by the move to produce more gasoline were disclosed as Humble Oil & Refining Company, Baytown, Texas; Neches Butadiene Products Company, Port Neches, Texas; Cities Service Company, Lake Charles, Louisiana; Phillips Petroleum Company, Borger, Texas; Shell Union Oil Company, Torrence, California; Sinclair Refining Company, Houston, and Standard Oil Company of Louisiana, Baton Rouge.

Threatened shortage of aviation gasoline is not due to a failure to estimate requirements properly, it was explained, but to the fact that enemy resistance has been less extensive than anticipated and, with good weather, it has been possible to use airplanes, both fighter and bomber, to a much greater extent than was believed possible.

As Dewey announced the cut-back in rubber production, PAW disclosed that it had already called upon producers of 100-octane gasoline to push their output to the limit.

A telegram sent refiners June 17 by Assistant Deputy Administrator Bruce K. Brown, advised that "cables from commanding generals in active threatres demand increased shipments of aviation gasoline."

"The all-out air effort has resulted in serious reductions in combat theatre stocks," Brown declared. "Army Air Forces, Royal Air Force and Navy are presenting most urgent pleas for immediate shipments above and beyond all previous estimates. It will be necessary to ship up to 50 percent more fuel than previously estimated for consumption in some of the more active theatres in the next two or three months.

"While Grade 130 fuel is the product shipped, increased production of components, butylenes, isopentane and isobutane for your own or other refineries is just as vital. Please push as hard as you possibly can. We have not enough today and will not have enough for several months. When and if full needs are met, every special facility will still be needed to produce high quality components for a higher quality fuel already authorized which will give increased offensive power and protect our airmen."

Refiners of 100-octane gasoline were given first-hand information regarding the situation at a secret meeting with high-ranking Army and Navy officials June 29.

The presidents and refining vice presidents of the companies making aviation fuel were called to Washington by Petroleum Administrator Harold L. Ickes, indicating the seriousness with which the situation is viewed by high administration officials.

Reportedly it was tacitly admitted that the Army had missed badly in its estimates of invasion requirements, with the result that the extensive reserves of 100-octane which had been built up in England had been badly depleted in the first two weeks of the attack on fortress Europe.

PAW officials said that civilian gasoline inventories were at a level which would insure the meeting of ration requirements during the period when transportation and other facilities must be devoted to the rebuilding of aviation fuel stocks, but in some quarters there was apprehension that the critical period might last longer than now anticipated, necessitating sacrifices on the part of civilians.

Present plans of the military, it is understood, call not only for replenishing stocks at foreign bases but for their expansion over original estimates, to eliminate danger of a recurrence of the present situation.

Minimum Viscosities Set

In another move to channel all possible material to military use, PAW last week established minimum viscosities for various grades of civilian fuel oils manufactured or used in District 5 which, it was explained, while having little effect upon the total civilian supply may necessitate the adjustment of furnaces to use the stripped oils at maximum heating efficiency.

Viscosity minima for the various grades of fuel oil as set by PDO 22 are: furnace oil—not less than 43 Saybolt seconds Universal at 100° F.; light domestic oil—not less than 35 Saybolt seconds Furol at 122° F.; bunker grade fuel—not less than 150 Saybolt seconds Furol at 122° F.; railroad and heavy industrial fuel—not less than 200 Saybolt seconds Furol at 122° F.

At the June 29 meeting, General H. H. Arnold, chief of the Army Air Forces; Air Marshall Sir William L. Welsh of the Royal Air Force, and Admiral D. C. Ramsey, chief of the Bureau of Naval Aeronautics, gave the refineries intimate reports of what has happened and is happening in various war theatres, and explained why more high-octane gasoline is imperative.

Deputy Administrator Ralph K. Davies explained that while all overseas military requirements are being met in full, the Air Forces of United Nations are operating on an increasingly expanding schedule which, he said, "means that we must produce in ever-increasing quantity. To do it, every facility and every man must now perform to absolute maximum capacity."

Administrator Ickes assured the military leaders that they would get the gasoline, declaring that "the oil industry has never failed to deliver in this war and it will not fail to do even the impossible now — again," and was backed up by PIWC Chairman William R. Boyd, Jr., who promised that the industry will "make good any check drawn upon it."

Present at the conference were Under Secretary of the Navy Ralph Board, top Army and Navy officials, including members of the Army-Navy Petro-

Grinsfelder Is Elected Vice President of Union

Sam Grinsfelder, manager of operations, Texas-Gulf division of Union Oil Company of California with headquarters at Houston, was elected vice president on June 26, 1944, and will continue to direct the work of the company in Texas, Louisiana, Florida, Mississippi, and Alabama. Grinsfelder has been associated with the company for the past 22 years, and for the past 4½ years has been manager of the Texas-Gulf division. He has also seen service in the Rocky Mountain and Pacific Coast divisions.

Sam Grinsfelder

At the same time, the board of directors elected Basil Hopper vice president in charge of all manufacturing. Hopper has served in the company's research and development departments as well as in manufacturing operations at Union's three refineries since becoming associated with the company in June, 1923.

leum Board; representatives of the British Royal Air Force, officials of Defense Plant Corporation, Office of Defense Transportation, State Department, War Shipping Administration, Foreign Economic Administration, British Petroleum Representatives and a large number of refiners.

On June 30, PAW reported that 80 percent of the authorized projects in the 100-octane program has been completed, with 150 units completed and in operation and 39, now building, to be completed by the end of the year.

With the refineries contributing to the 100-octane production before the start of the current construction, approximately 450 refineries and natural gasoline plants are now engaged in making 100-octane or its components. A break-down of the program showed 56 alkylation units completed and 13 building; 26 isomerization units completed and 9 building; 26 fluid catalytic cracking units completed and 7 building; 10 thermofor catalytic cracking units completed and 6 building; 9 Houdry catalytic cracking units completed and 1 building; 4 Houdry units revamped; 2 hydrogenation units completed and two dehydrogenation units built and 15 miscellaneous units built and 1 building.

Two New Divisions for Handling U. S. Tankers

Two new divisions have been set up in the War Shipping Administration to handle all matters related to tanker allocations and operations.

B. B. Jennings, formerly assistant deputy administrator for tanker control, has been named director of a new division of tanker allocations reporting directly to the deputy administrator for vessel utilization and is responsible for all matters relating to the employment and allocation of the use of tankers movement of tanker cargoes and questions of policy.

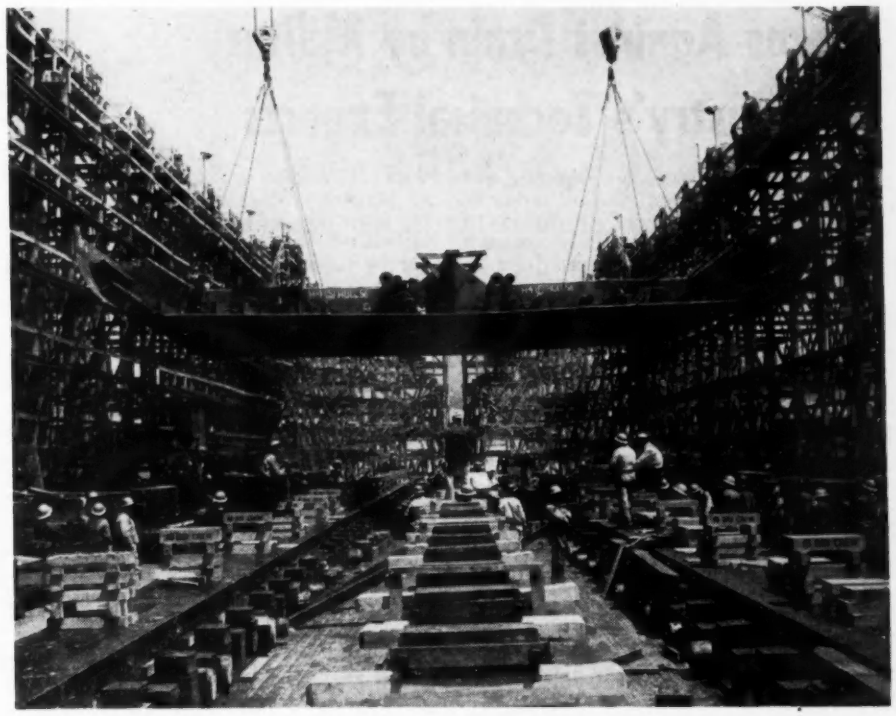
J. W. Bancker, formerly executive assistant to Jennings, will head a tanker operations division, reporting to the assistant deputy administrator for ship operations and responsible for all activities related to the physical operations of tankers controlled by the WSA.

Director of Oil Reserves for the Navy Is Retired

Rear Admiral Harry Allen Stuart, since 1933 director of naval petroleum reserves, retired from the Navy last month after 43 years of service.

Born in Tazwell, Virginia, June 16, 1882, he entered the Naval Academy in 1900, and upon graduation was assigned to the Asiatic fleet.

A pioneer in the Navy's conversion from coal to oil, Stuart left the U.S.S. Louisiana, on which he was navigating officer, in 1918, for duty in Washington in connection with fuel oil and gasoline supplies. He was assigned as inspector of naval petroleum and oil-shale reserves in Wyoming, Colorado and Utah in 1924, and until 1929 was assistant director of fuel oil reserves. After service from 1930 as manager of the Pearl Harbor navy yard, he was designated inspector of the California reserves in 1932 and the following year became director of naval petroleum reserves.



The keel section of one of the new "Hills" class of large oil tankers is being dropped into place in the above picture taken at the Marinship yard, San Francisco Bay. There will be 24 such ships, each with 8250 horsepower, and of 16,500 deadweight tons. The first of these ships, all to be named for important California oil fields, is the SS Kettleman Hills. Others to follow by May, 1945, in order, are: Elk Hills, Lost Hills, Antelope Hills, Buena Vista Hills, Coalinga Hills, Montebello Hills, Inglewood Hills, Baldwin Hills, McKittrick Hills, Newhall Hills, Rincon Hills, Potrero Hills, Sunset Hills, Midway Hills, Whittier Hills, Signal Hills, Ventura Hills, Puente Hills, La Brea Hills, Santa Maria Hills, Kern Hills, Elwood Hills, and Torrance Hills. The gasoline delivered by a single one of these tankers would send 1,000 four-engined bombers on six round-trip bombing missions to Berlin from British bases.

Elk Hills Expansion to be Started Immediately to Meet Military Needs

Agreements approved by President Roosevelt last week for development of Naval Reserve No. 1 by Standard Oil Company of California will be followed by immediate action to drill 300 new wells in the Elk Hills field to up production from 15,000 to 65,000 barrels daily, it was announced by the Navy Department June 29.

The department disclosed that Standard Oil Company has 12 strings of tools which would move on Elk Hills immediately, with further drilling to be carried forward as rapidly as materials and crews can be made available.

Agreements with the oil compny, first projected in a contract approved by the President in November, 1942, and rescinded a year ago on the basis of a critical opinion from the Department of Justice, provide for surrender by Standard of control of its lands in the reserve with a provision that it may produce and retain 15,000 barrels of oil daily for refining into war products, to cover its expenses, and an operating arrangement under which Standard will provide, at absolute field cost, the extra porduction of Navy oil which is to be sold to the highest qualified bidder for preparation for war use.

The legislation on which the agreements are based was accompanied by a joint resolution authorizing the production of 30,000,000 barrels of oil from Elk Hills during the next 18 months.

With completion of the 300 new wells contemplated, the reserve will have a total of 534 wells, 234 already being in production. All of the oil will be taken from the shallow zone, the crudes from which, the department explained, are extremely high in both active and lubricating qualities. This zone is divided into the first and second Sub-Scalez zones and the Mulinia and Sub-Mulinia zones. The oil sands in the Scalez zone, it was said, have characteristics which indicate that oil in place is over 1500 barrels per acre-foot.

Operations at Elk Hills will be under the direct supervision of the Navy's Office of Naval Petroleum Reserves, under its new director, Captain William G. Greenman, who is succeeding Rear Admiral Harry A. Stuart.

The average depth of the new wells on the reserve will approximate 3000 feet; the surface spacing will be 1 well per 10 acres, but since a differentiation will be made in the sands from which they are to be completed, the subsurface spacing will be 1 well per 20 acres.

Osage Lease Sale

A total of 13,448 acres of Indian lands in Osage County will be offered for oil lease at auction July 26, at Pawhuska, Oklahoma. With three exceptions the 85 tracts to be auctioned are 160-acre units.

Warns Against Drain by Military Of Industry's Technical Experts

Warning that steady draining of skilled manpower from the oil industry by the military services threatens to impair production of vitally needed petroleum products was voiced June 25 by William R. Boyd, Jr., chairman of the Petroleum Industry War Council.

Commenting on the results of a special labor study by the council's technical advisory committee, Boyd pointed out that so long as the armed services are utilizing all kinds of equipment in circumstances that necessitate use of the best brains available they will continue to need the technical skills and facilities of the oil industry, but, he added:

"Absence of technical personnel is seriously curtailing improvements in aviation gasoline that are possible with little or no addition to current facilities. A situation even more serious may arise in the fields of specialized lubricants and myriad other petroleum war products if modernly equipped laboratories, pilot plants and refineries are not kept staffed with qualified specialists."

The study showed that 19 companies with 117 refineries, representing about 75 percent of the capacity of the refining industry and most of the production of critical war materials, employ 100,000 persons, less than 8 percent—7,900—being trained technical personnel who are fully engaged in the field of chemistry, physics or engineering. More than 97 percent of the technical force is working on war problems, and of the few remaining, most are so highly specialized in experience and training as to preclude adjustment to other than their normal activities in any event. The situation is further intensified by the virtual closing of the major source of technical personnel, the colleges, by military and war manpower regulations.

"Considering the paramount importance of the effort of petroleum's trained technicians in maintaining present-day production and quality and what may reasonably be accomplished by continued endeavor, it is strongly felt that any further loss from oil's professional personnel will imperil the industry's vital contribution to the war effort," Boyd declared.

"There are many problems pertaining to improvement in quantity and quality of petroleum products for war uses which require immediate solution. Based upon the record of rapid accomplishment during the war to date, many of these problems will be solved sufficiently soon to be effective during the rest of this war through application of continued research and development—provided trained technicians are kept available."

P-98 Changes Mean Less Paper Work for Industry

Requirements of Petroleum Preference Rating Order P-98-B were revised by WPB last week to eliminate much paper work heretofore required of operators.

One change eliminates need for submitting copies of delivery orders to PAW for other than controlled materials, and provides preference ratings and allotment symbols for materials used in those small operations permitted to be undertaken under petroleum administrative orders without specific authority.

The latter will apply to special production operations, natural-gasoline recovery, transportation and refining, relieving the industry of the burden of filing either a Form WPB-541 or a PAW Form 30, requesting priorities assistance for such small operations in those branches.

The procedure for obtaining priorities assistance for large projects has been revamped into a new PAW Form 30, which eliminates a detailed list of all material and equipment required for the project. Controlled materials required will be reported only as an estimated summary, and instead of receiving a "bank credit" type of allotment, operators will be authorized to use an allotment symbol to obtain all controlled materials required for the project without the need to maintain detailed records concerning use of such materials.

"Although many critical materials are tight, it is desirable to simplify procedures for obtaining them," Petroleum Administrator Davies said, "With informative date compiled from experience to date, PAW is now fortified to fulfill its responsibilities as a claimant agency and, at the same time, relieve petroleum operators of many clerical burdens."

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED July 1	June 24
Alabama	100	100
Arkansas	80,300	80,400
California	848,100	848,700
Colorado	8,400	8,200
Illinois	208,200	208,800
Indiana	12,950	12,450
Kansas	274,400	289,700
Kentucky	21,800	19,300
Louisiana	363,200	363,100
North Louisiana	74,200	74,100
South Louisiana	289,000	289,000
Michigan	47,200	50,200
Mississippi	41,500	45,200
Missouri	100	100
Montana	24,380	22,300
Nebraska	1,000	1,000
New Mexico	108,250	108,200
New York	12,900	13,500
Ohio	7,500	7,500
Oklahoma	338,300	332,300
Pennsylvania	38,600	39,600
Tennessee	35	35
Texas	2,037,500	2,037,500
Upper Gulf Coast	528,900	528,900
East Texas Field	360,900	360,900
Rest of Eastern Texas	145,000	145,000
Lower Gulf Coast	215,800	215,800
Southwest Texas	77,550	77,550
South Central Texas	19,800	19,800
West Texas	448,050	448,050
North Texas	149,500	149,500
Panhandle	92,000	92,000
West Virginia	8,200	8,600
Wyoming	91,450	84,300
Total United States	4,574,365	4,581,015

Navy Field to Be Handled As Other Surplus Property

Prompt disposition by the Navy of its Moore airfield, the 532 acres at Norman, Oklahoma, where surrounding oil development made the field too dangerous for aviation before it ever was used, was provided for by the House of Representatives as it prepared to recess last week, by its refusal to consider legislation to sell the land back to the original owners.

Debate on a rule to bring up the measure developed that the Navy has been offered $750,000 in cash and royalties for the tract by an oil company. The land was condemned and purchased in 1942 for $46,431, and the Navy spent $150,000 improving it; oil was discovered on surrounding land before the field was completed and, being unable to use it for the original purpose, the late Secretary of the Navy Frank Knox suggested that it be sold back to the former owners for the approximately $196,000 which the government had expended.

Defeat of the rule by a vote of 130 to 156 was based on the contention that adoption of the legislation would establish a precedent for a principal that whenever anything that the government has bought has increased in value it must be sold back to the original owners at the price paid them.

It was asserted that such a precedent would greatly complicate the task of the government agencies in disposing of billions of dollars of surplus property after the war. The present law authorizes the Navy Department to dispose of surplus property at public auction to the highest bidder.

Sharp Increase for May In Federal Oil Levies

Treasury collections from the three direct federal taxes on oil increased sharply in May, with receipts from gasoline increasing from $15,953,485 in April to $26,787,672, on lubricating oil from $3,496,380 to $5,258,971 and on pipe-line transportation from $942,652 to $1,576,888.

Despite the month's increase in gasoline-tax collections, the revenue from that source for the government's fiscal year ended June 30 appeared to have been at least $20,000,000 under that of the preceding year.

Gasoline-tax collections for the first 11 months of the year aggregated $250,187,985 against $271,010,259 for the previous year, a loss of $20,822,274, while lubricating-oil collections were $48,664,586, an increase of $8,008,025 over fiscal 1943's $40,656,561, and pipe-line transportation returned $14,229,486, an increase of $1,302,986 over the $12,926,500 recorded in the preceding year.

Frame Is Named Director Of PAW Refining Division

Appointment of A. P. Frame, vice president of Cities Service Refining Corporation, as director of the Refining Division of PAW to succeed E. D. Cumming was announced June 30.

Frame, who has been with the Cities Service organization since 1924, will take over his new job about August 1.

Invasion Needs Make Every Barrel of Oil Count

Failure of record near-capacity output to equal needs during early invasion stages, presages such acute shortage when fighting on new land front attains peak that it will be duty of each oil man to go all-out in effort to produce, refine and ship every barrel possible

By WARREN L. BAKER, Editor

IN REFLECTION of expanded and more intensive fighting that will follow the invasion of Europe and the "ahead-of-schedule" progress in the Pacific area, military consumption of petroleum products will increase enormously in coming months. This growth in consuming rates, coming on top of current record producing and refining levels that have practically reached maximum capacities, indicates that the task of providing an adequate supply of petroleum to fulfill military requirements and essential civilian needs is to become extremely acute before Germany is defeated.

Patriotic Call

The problem of meeting the demand likely will be such a "touch and go" affair that henceforth every barrel of oil will count. With current production, transportation and refining operations so dangerously near maximum capacities, an extremely sensitive balance between supply and demand has developed. For instance, a recent diversion of a few thousand barrels of crude oil from one refinery center to another has affected the crude supply picture of a substantial portion of the United States, because of requisite readjustments in flow of raw materials to the end that no refining plant would experience a loss in throughput. The sensitive reaction of the industry now is tuned to a few thousand barrels of crude, whereas it took 100,000 to 300,000 barrels during 1942 and 1943 to seriously disturb the supply-demand ratio.

Failure of a producing area to maintain its maximum efficiency rate during any period when it is necessary for the industry to operate at capacity is, so far as the war is concerned, production lost forever. This loss cannot be made up, and in turn lowers the efficiency rate of both transportation and refining, and the war effort suffers accordingly.

It is the obligation of every one in the oil industry to be alert to this grave problem, and to exercise maximum effort to maintain capacity operation in all branches in order to meet the increased demand for petroleum products in combat areas. Every barrel must be looked upon as a vital and direct military contribution. It is the duty of each oil man —whether a small operator, a company president, a superintendent or a roustabout—to see that every possible barrel is produced, refined and transported. To make that last extra drop of oil available to the armed forces, wells, pipe lines and refineries must be kept in full operation, regardless of influence on personal income or tax rates.

Quick Change in Supply Picture

The quick change that has occurred in the oil supply picture since start of the European invasion, and just how critical the problem of furnishing additional sufficient petroleum may become, can be realized by studying the recent trend of the industry's supply and demand relationship.

During the four weeks ended June 3, or just prior to the land attack on Western Europe, crude oil production averaged 4,513,000 barrels daily, and crude oil stocks declined at an average rate of 8200 barrels a day. Thus, production was fairly well in balance with demand for crude oil. Since start of the European invasion, United States crude oil production has risen to unprecedented levels each week. But record output of crude, although assisted by enlarged importation rates, has not been sufficient. In contrast with small withdrawals from above-ground stocks previous to the invasion, there have developed exceptionally heavy drafts on these inventories, as runs to stills, evidently in reflection of enormous takings of petroleum products for military purposes, also have increased substantially.

A brief chronological review of the United States oil supply-demand trend since commencement of the invasion runs like this:

First Invasion Week: Crude oil production during the week ended June 10, or during the first five days after Allied troops landed on the shores of France, equalled the record output of the preceding week in average 4,522,500 barrels daily. But crude runs to stills rose 50,000 barrels above the previous week in averaging 4,670,000 barrels a day, and consequently crude stocks dropped 455,000 barrels daily during the week. Record refinery operations prevented all but extremely small reductions in stocks of gasoline, and permitted satisfactory additions to both heavy and light fuel oil inventories.

Second Invasion Week: Crude oil production averaged 4,568,000 barrels daily during the week ended June 17, up 45,000 barrels from the peak of the preceding week, 140,000 above late April, and 600,000 barrels greater than a year ago. Refinery runs of crude, however, soared upward by 82,000 barrels daily, averaging 4,752,000 barrels per day, or at the almost incredible rate of 97 percent of the present large-rated capacity of 4,908,000 barrels a day. At this rate, runs were 450,000 barrels a day greater than at the end of last April and 853,000 barrels per day above a year ago. In totaling almost 200,000 barrels above domestic crude production, whereas normally not equalling production, runs to stills indicated the importation of large quantities of oil. Despite the unusually large amount produced, record refinery operations resulted in another heavy draft on crude oil stocks, during this week. Withdrawals averaged 100,000 barrels per day. Record refinery runs, however, failed to prevent heavy withdrawal from gasoline stocks, which dropped 235,000 barrels daily. Only normal seasonal increases occurred in either heavy or light fuel oil stocks.

Third Invasion Week: Again crude oil production rose to another new all-time peak, averaging 4,583,000 barrels during the week ended June 24, or 15,000 barrels more than in the preceding week. Crude runs to refinery stills, however, were off sharply, averaging but 4,638,000 barrels per day. Figures are not available yet for crude oil storage trends, but the nearer relationship between refinery runs and crude production would indicate a smaller withdrawal of supplies from these stocks.

Military Developments

Recent war developments explain why military use of oil is certain to increase sharply henceforth, and also foreshadow important changes in the relative consuming rates of different types of petroleum products. With air and naval forces still expanding rapidly as new planes and ships go into action, more aviation gasoline and fuel oil surely will be needed in the future. Although quantities consumed by enlarged air and naval forces will be a significant factor, the biggest immediate gain in military consumption—the one that will cause a sudden sharp uptrend at this time—will be in enlarged use by land forces. These products include motor grade gasoline for tanks and trucks, and lubricants for these vehicles and guns.

The successful capture of the Normandy peninsula was but the opening phase of a gigantic new land battle front that should become the largest oil consuming zone of the war. Because the Soviets to a large degree have furnished

■ CONTINUED ON PAGE 52

Oil Compact Hears About Expanding Federal Control of Mineral Rights

HIRAM DOW, New Mexico representative to the Interstate Oil Compact Commission, giving the keynote address at the session held in Denver, Colorado, last Friday, pointed to the expanding federal control of mineral rights as one of the greatest menaces the oil industry has faced.

Dow urged immediate action on the part of the Compact, especially in advising the public of these activities. He declared that the government no longer has a liberal policy in handling the public domain, which is expanding constantly. There are now 27 federal agencies which own public lands. Between them they control more than 383 million acres or one fifth of the total area of the United States. Either congress must revise the mineral leasing act, Dow said, or cede these lands to the states. He favors the latter course.

The Department of Agriculture and the Department of the Interior own 95 percent of these lands and each has different regulations governing leasing of the lands which it controls. He declared that the Department of the Interior, through its regulations interpreting the leasing act of 1920, has virtually nullified the act. "It has gone far afield from the intent and purpose of the law," he declared.

Federal Expansion

The speaker thought that this was caused in part by the fact that some states lacked conservation laws. The result has been that the bureau expanded its regulations to control drilling operations. Thus in New Mexico where there is an adequate conservation law, operations on public lands are likewise subject to federal regulations, a useless duplication in which the federal bureau is dominant.

These federal regulations, Dow said, tend to discourage development because they constitute such a dangerous burden, and although the state has a far greater interest in the oil than has the federal government, yet Washington is in control.

The new public lands acquired by the Department of Agriculture are in every state, and included nearly 163 million acres on January 1, 1944. Much of this land was obtained through the farm mortgage program, and when it is sold, the government retains three fourths of all the mineral rights. Some of their properties were offered for lease on May 16, 1944. But Dow declared that the leasing requirements were such as to make the department the actual operator of the lease, while the operating company was in fact only a drilling contractor for the federal government.

Department Retains Control

The Secretary of Agriculture, Dow pointed out, retains the authority to determine the rate of production from these leases, and has a representative to "supervise and direct the operations of the property." Thus the department is able to retain complete control of the entire operation. Dow quoted from the Baruch report to the effect that this was bad public policy and should be abandoned. He urged the Compact to oppose this program by supporting corrective legislation in Congress and by the enactment of sufficient conservation laws in those states which have none.

The Denver meeting was well attended. The address of welcome was made by Governor J. C. Vivien of Colorado, who declared that "We must get rid of a lot of federal regulations which are preventing the development of the oil industry in this region." He insisted that the oil could be found if these restrictions are removed.

Representatives were present from 8 of the 13 states which are members of the compact, and three large delegations of operators from Texas, Oklahoma and New Mexico.

Activities in Rockies

One feature of the meeting Saturday was a review of "Oil and Gas Prospects in the Rockies" by Thomas S. Harrison, consulting petroleum geologist who noted that as early as 1862, three years after the Drake well was drilled, several shallow wells were drilled in the Florence area, north of Canon City, Colorado, on the strength of oil seeps from exposed Jurassic Rocks. In 1876 the initial Pierre Cretaceous Shale well was drilled in this area. Practical geologists of the day thought the Florence-Canon City basin was literally filled with oil. Florence field has produced, to January 1, 1944, 13,827,000 barrels of oil from depths of 1000 to 2300 feet.

Salt Creek was the next important find, the first well, 2 miles north of the field proper, having been drilled through error caused by the tools being unloaded at the wrong place. The first Shannon sand producer was at a depth of 600 feet.

Wall Creek Sand

A representative of a Royal Dutch group located a well, completed late in 1908 as the first Wall Creek sand of the Frontier (Cretaceous) at 1000 feet. Initial development of this field was not by experienced oil men but by enterprising Americans who knew little or nothing of the business.

Between 1912 and 1918 oil or gas was discovered in Wyoming at Oregon Basin, Little Buffalo Basin, Grass Creek, Elk Basin, Big Muddy, Lost Soldier, Rock River, and Lance Creek. Later, in Montana, Cat Creek and Kevin-Sunburst came in in 1920 and 1922, Cut Bank in 1935. In Colorado, Fort Collins and Wellington were discovered in 1923, Moffat and Iles in 1924, Rangeley Deep in 1933, and Wilson Creek in 1937.

Titles gave some trouble in early days, most discoveries being on Government Domain, and attorneys determined that oil, being mineral, came under the Placer Act.

A period of unprecedented wildcatting, discovery, and development in the Rockies is foreseen by the speaker. A stratigraphic column including Tertiary, Cretaceous, Jurassic, Permo-Pennsylvanian, and Mississippian has already been proved productive.

As of January 1, 1944, Colorado, Montana, and Wyoming have produced a total of 752,000,000 barrels of oil, of which 44,700,000 barrels were produced in 1943. Daily average production is now around 120,000 barrels.

Work is now in progress on a much needed pipe line to serve fields from Elk Basin to Casper, which will provide an outlet to broader markets, Harrison reported.

Memphis Gas Boost Opposed in Louisiana

Memphis Natural Gas Company has obtained an indefinite continuance of its case before the Federal Power Commission for permission to build a 50-mile line linking the Lisbon gas field in Claiborne Parish, Louisiana, with its present facilities in the Monroe field in Ouachita Parish.

H. W. Bell, director of Louisiana Minerals Division, and P. A. Grye, secretary of the Louisiana Public Service Commission opposed the continuance, asserting they were ready to present further data opposing further tapping of the state's gas resources. F. A. McEachern, who filed the plea for the company, said a new date for hearing probably would be requested within 90 days.

The company will seek a rehearing on its recently denied application before the Federal Power Commission to expand capacity of the present system serving Memphis. Need for conserving Louisiana gas was the ruling factor in the denial of the petition.

Interstate Natural Given Permit to Remove Line

The Federal Power Commission has authorized the Interstate Natural Gas Company, Monroe, Louisiana, to abandon and remove the northern 40,840 feet of its 16-inch line between Perryville and Alto, Louisiana, and to construct two additional 1000-horsepower compressors at its Desiard station at Fowler, Louisiana.

The commission also has authorized the Cities Service Gas Company, Bartlesville, Oklahoma, to construct and operate a cooling tower and miscellaneous equipment at its Blackwell, Oklahoma, compressor station, and to build 35 miles of 16-inch loop line from that station to Burbank, Oklahoma.

A hearing has been set for July 14, in Washington, on the application of the New York State Natural Gas Corporation to purchase a pipe line located in Pennsylvania and a telephone line which parallels it.

An application has been filed by the Kentucky Natural Gas Corporation, Owensboro, Kentucky, for authority to build an 18-mile 16-inch pipe line from Russellville, Kentucky, to connect with the pipe line of the Tennessee Gas Transmission Company now under construction.

Wolff on Committee

The manpower sub-committee for District 3 announces that Robert Wolff, Sun Oil Company, Box 2831, Beaumont, Texas, is a new member of the committee. He will handle requests for employees in his territory and inquiries from Beaumont and the surrounding vicinity should be directed to him.

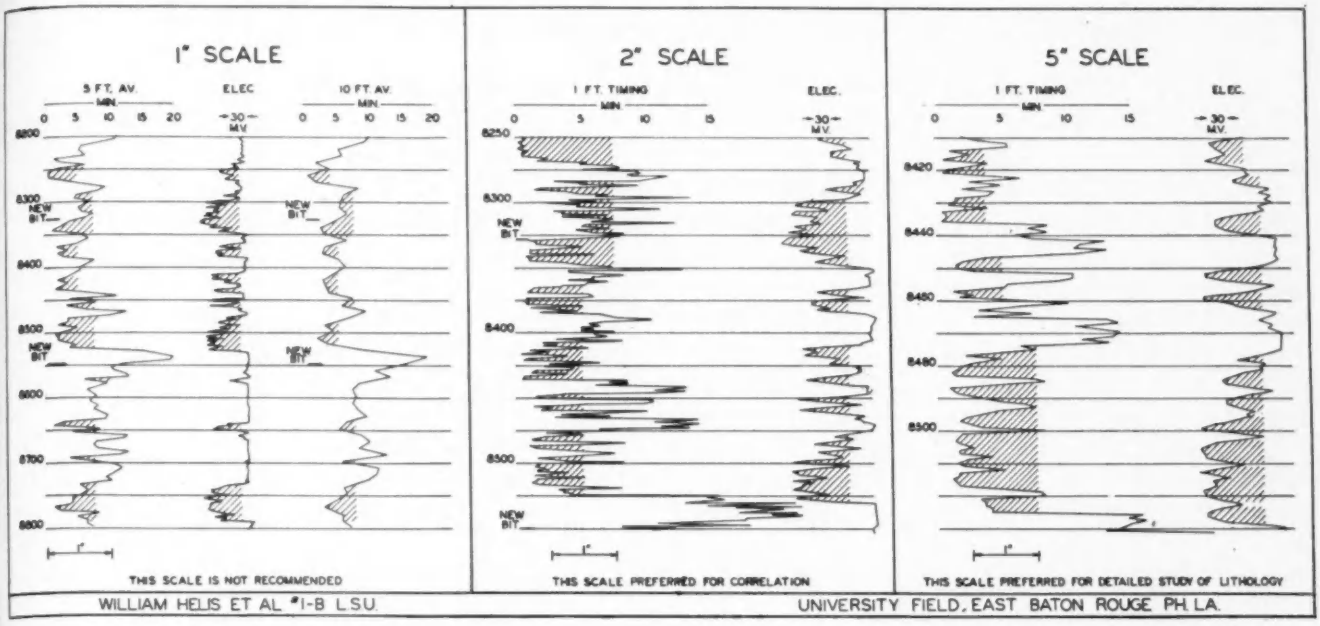

1" SCALE
2" SCALE
5" SCALE
THIS SCALE IS NOT RECOMMENDED
THIS SCALE PREFERRED FOR CORRELATION
THIS SCALE PREFERRED FOR DETAILED STUDY OF LITHOLOGY
WILLIAM HELIS ET AL #1-B L.S.U.
UNIVERSITY FIELD, EAST BATON ROUGE PH. LA.

FIGURE 1
Comparison of Scales. (Scales necessarily reduced here because of space limitations)

Geologic Use of Drilling-Time Data

By G. FREDERICK SHEPHERD and GORDON I. ATWATER

ATTENTION paid by the driller to such drilling conditions as weight of pipe, type of bit, rotary speed, torque on the bit, and mud characteristics serves chiefly to aid him in making the most hole possible in the least amount of time. The observation of drilling time to him is an account of his rig's performance under existing well conditions and enables him to modify these conditions with changes in lithology. The applicability of drilling-time data was recognized, according to J. V. Howell,* as early as 1880, but only in recent years has the full possibilities of drilling time begun to be appreciated. In recent literature, stress has been laid to the engineering applications of time drilling. This paper summarizes some of its many geologic uses.

Geologists have used the method of time drilling for many years in certain areas as an aid to them in coring, determining permeable streaks in limestones, and in sample logging. Generally such time drilling has been used for only short sections of a well. Time drilling has not attracted the attention of geologists working in the Gulf Coast to the extent to which it is probably entitled. This is in all likelihood the result of excellent reactions to Tertiary lithology of the electric log.

A continuous record of the rate of penetration made by any method or mechanical device may be adequate for the multiple uses of drilling-time data. It is felt, however, that the more fully automatic the recording is, the better will be the resulting log. Our experience with a semi-automatic continuous recorder has been gained by use on 28 wells drilled in three states and through a stratigraphic range from early Miocene to Lower Cretaceous. The total footage exceeds 138,000 feet.

After considerable experimentation

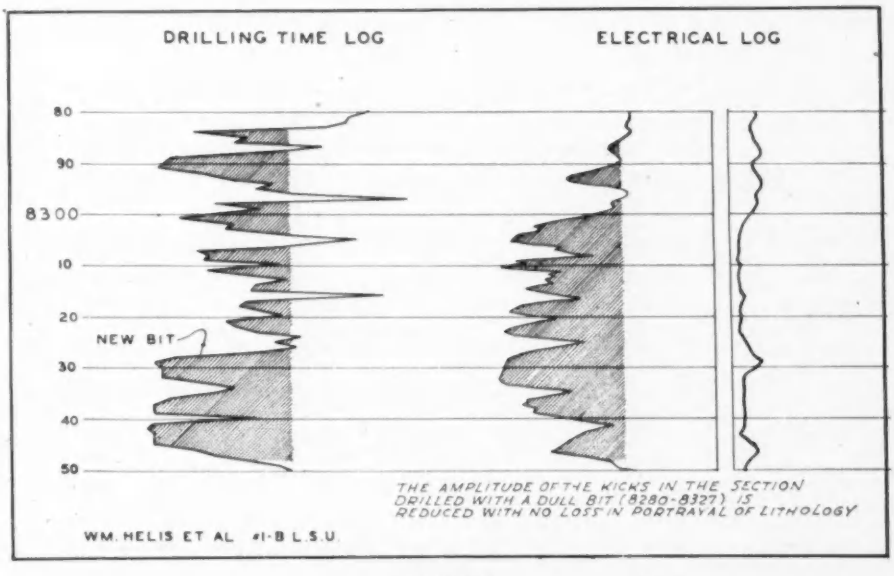

DRILLING TIME LOG
ELECTRICAL LOG
NEW BIT
THE AMPLITUDE OF THE KICKS IN THE SECTION DRILLED WITH A DULL BIT (8280-8327) IS REDUCED WITH NO LOSS IN PORTRAYAL OF LITHOLOGY
WM. HELIS ET AL #1-B L.S.U.

FIGURE 2
Effect of Bit Changes on Drilling Time Log Characteristics

*Dr. J. V. Howell, in personal correspondence, cites a paper by John F. Carll, in Vol. III, Second Geological Survey of Pennsylvania, 1880, in which the recording of drilling time is discussed.

†Paper presented by G. Frederick Shepherd before the New Orleans Geological Society, November 1, 1943; the Mississippi Geological Society, March 15, 1944; the East Texas Geological Society, April 3, 1944; and by Gordon I. Atwater before the Houston Geological Society, February 17, 1944.

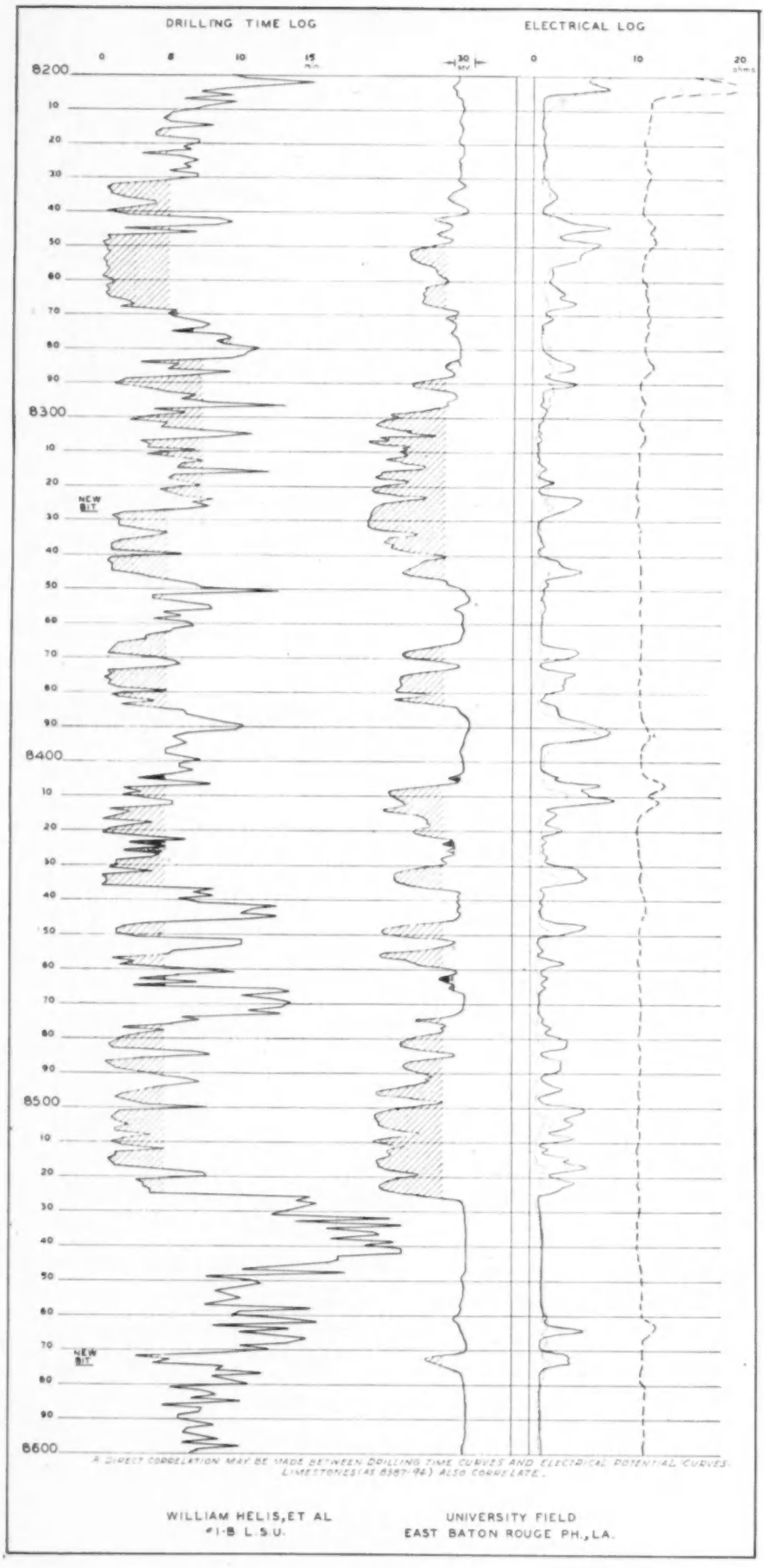


FIGURE 3
Correlation by Drilling Time

we found that the scales illustrated in the two columns on the right side of Figure 1 have been most satisfactory. For normal correlation we use a vertical scale of 2 inches equals 100 feet for depth and a horizontal scale of 1 inch equals 5 minutes for time. A log on a vertical scale of 5 inches equals 100 feet, with the same horizontal scale as on the 2-inch log, is used for detailed study of lithology.

Subsurface Control from Drilling Time

The chief advantage of time drilling to the geologist is the availability of subsurface control of a well while it is being drilled. Reliable information is obtained for correlation, wire line and side wall coring, measurement checks, reserve estimates, and as insurance against the loss of the lithologic record of a well in the event the hole is lost before an electrical log is run. In addition, it has proven of value to the engineering and production departments in analyzing well costs, observing bit performance and in meeting certain special problems.

When the use of automatic drilling-time logs was first considered, it was felt that their value might be greatly impaired if the method used did not make allowance for changes in drilling conditions. Experience has demonstrated, however, that lithology is the controlling factor in rate of penetration and with rare exceptions determines the pattern of the curve. It may be said that mud characteristics, rotary speed, drilling weight, type of bit, and other factors involved in drilling affect only slightly the relative speed at which a formation is penetrated. While these factors are not without influence on the rate of penetration, the effect is relative in that the sand-shale base line may shift to the right or left on the plotted log as a result of a change in the drilling condition, but any change in lithology encountered will, nevertheless, be revealed. Figure 2 shows the shifting of the sand-shale base line in the middle of the 8300-foot sand where a new bit was added. Contact of the sand body with overlying and underlying shales and shale breaks within the the sand itself are clearly recognizable, although the amplitude of the kicks in the section drilled with the dull bit has been reduced.

Drilling-time logs may be used for most purposes served by the potential curves of electrical logs. The correlation between a drilling-time log and an electrical log of a well in University field, East Baton Rouge Parish, Louisiana, is shown in Figure 3. There is remarkable detail in the correlation of the drilling-time log with the potential curve. Resistivity kicks, as at 8390 feet, resulting from limestone or cemented sandstones also correlate directly with slow drilling intervals on drilling-time logs.

Correlation Between Drilling Time Logs

In addition to the correlation between electrical and drilling-time logs it is possible to get excellent correlation between drilling-time logs of different wells. Such correlation is illustrated in Figure 4 with two wells in University field, one near the center of the field and the other a distant flank test. Correlation between these logs is supported by potential curves of electrical logs of the same wells. In drilling the second or flank well, geologic control was available by

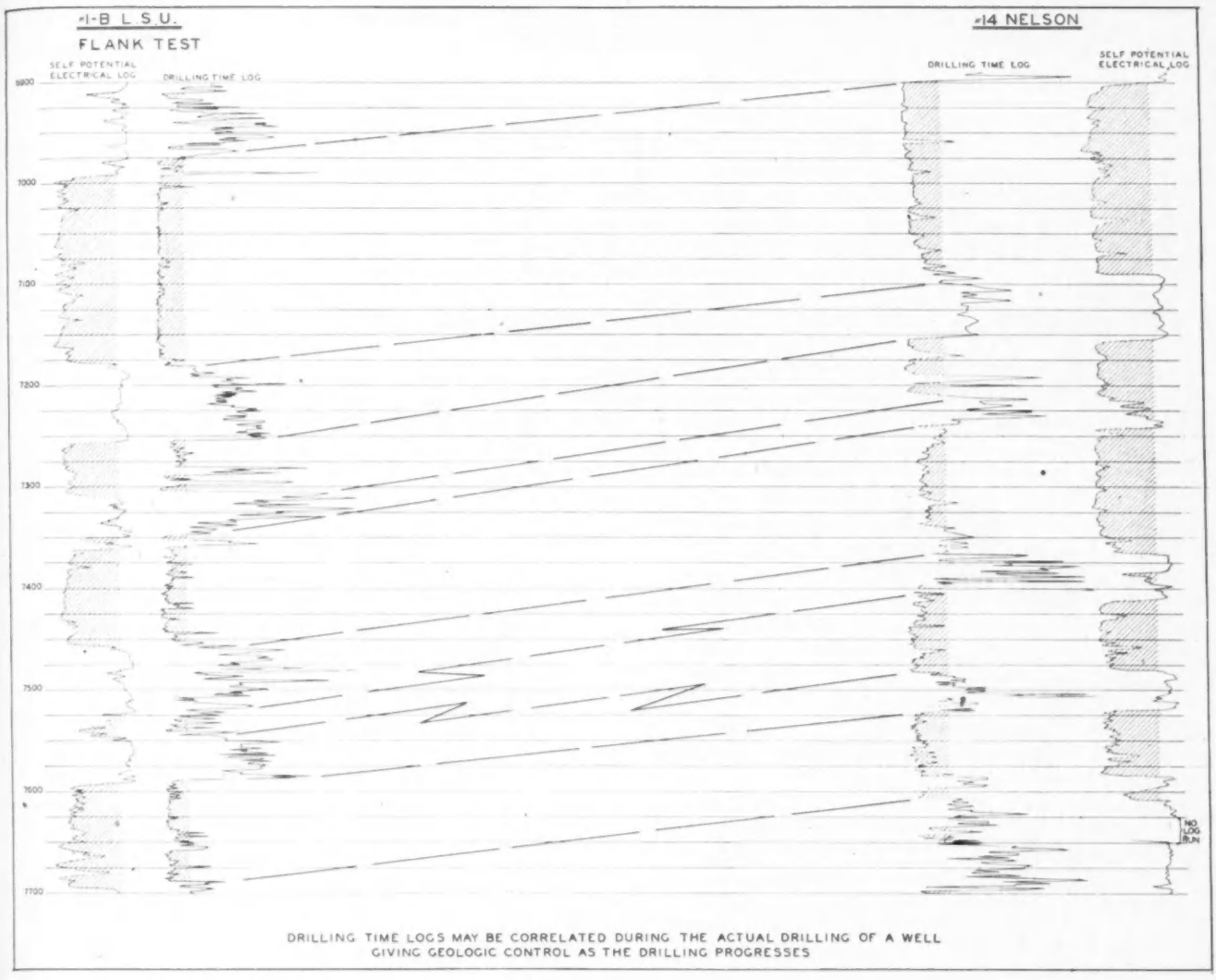


FIGURE 4
Correlation of Drilling Time Logs

correlation with both logs of the other well.

In some cases it has been found that correlation between a drilling-time log and an electrical log is not possible for certain portions of the section because of unusual charactiristics of formations involved. In the same field, for example, one adjoining sand and shale section has drilling characteristics which are reverse to those normally encountered in these lithologies. The sand, with normal electric potential, drilled slowly, and the adjoining shale, appearing normal on the electric log, drilled like clean sand. This led to difficulties in correlation the first time it was encountered, but on drilling additional wells through the same section it was noted that these drilling characteristics persisted, indicating that these formations had certain physical properties, *per se*, which controlled the rate of penetration and because of this these abnormal patterns could be correlated.

Drilling-time breaks in shale sections have been noted which are consistent from well to well within limited areas. These breaks probably represent critical changes in shale lithology or mineralogy which are not reflected on electrical logs and which might even escape detection in cores. Not only are such breaks correlative on drilling-time logs, but they have also been found to coincide with changes in the radioactive properties of the shales. Drilling-time logs can be correlated with gamma-ray logs, therefore, in sections where correlation is not possible with electrical logs. This has been helpful in detecting within a close range the penetration point of fault planes, as well as giving additional control of other structural conditions. Figure 5 shows potential, gamma-ray, and drilling-time logs through a short shale section of a well in Liberty County, Texas. The break at 6670-80 feet is recognizable only on the gamma-ray and drilling-time logs and there is no trace of a change in lithology on the electrical log. Close harmony in the correlation of other minor lithologic breaks is found on all three logs.

By means of reliable correlation available with the use of drilling-time logs it is possible to know in advance of electrical logging whether a given well is thinning or thickening. Missing sections and the approximate position of fault planes have been determined in a number of wells and this information used in changing the program of anticipated coring. On a recent flank test the first electrical survey supported the fact established by drilling time that the well was running approximately 160 feet low and it was generally thought to be destined to abandonment. The original coring program was changed on the expectation that the objective sands would occur below the probable water level. After drilling 300 feet deeper the drilling-time curve indicated presence of a new fault which had sufficient throw to raise the sands high enough to have saturation. The abandoned coring program was therefore reinstated and the sands were cored on the basis of geologic control from drilling-time data. No electrical log was run until after the section had been cored. The well is now flowing pipe-line oil from this zone.

Control of Directional Holes

Correlation with drilling-time logs has been used to check the course of directionally-drilled holes. This is particularly useful in drilling on flanks of salt domes where the geologist lacks sufficient subsurface control to determine the geographic position of his objective. By correlating with logs on the original and sidetracked holes a current check on structural relationship can be kept and the course of the sidetrack changed if necessary. This structural control is available by determining if the sidetracked hole is running too high or too low in reference to the structural position desired. A schematic drawing of this application is shown in Figure 6. The insert shows the surface location of the original hole which, as shown on the cross section, would encounter salt without penetrating the objective sand. After revising contours on top of the

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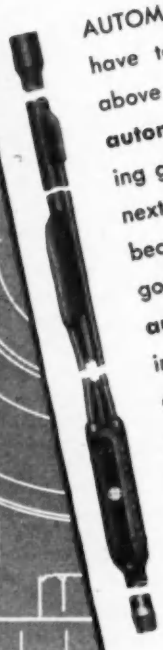

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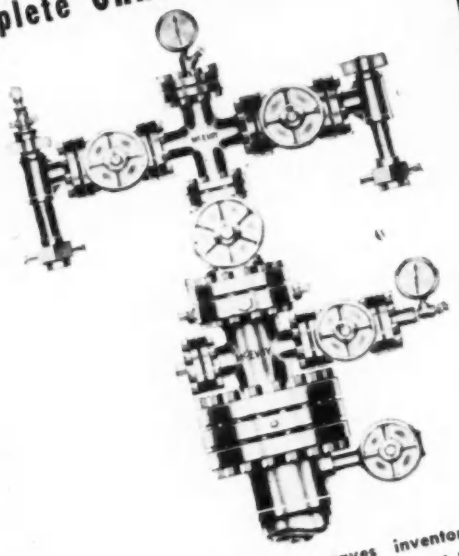

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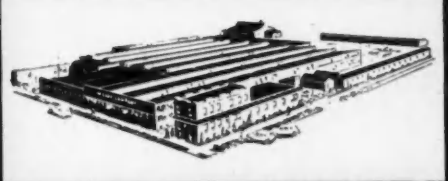

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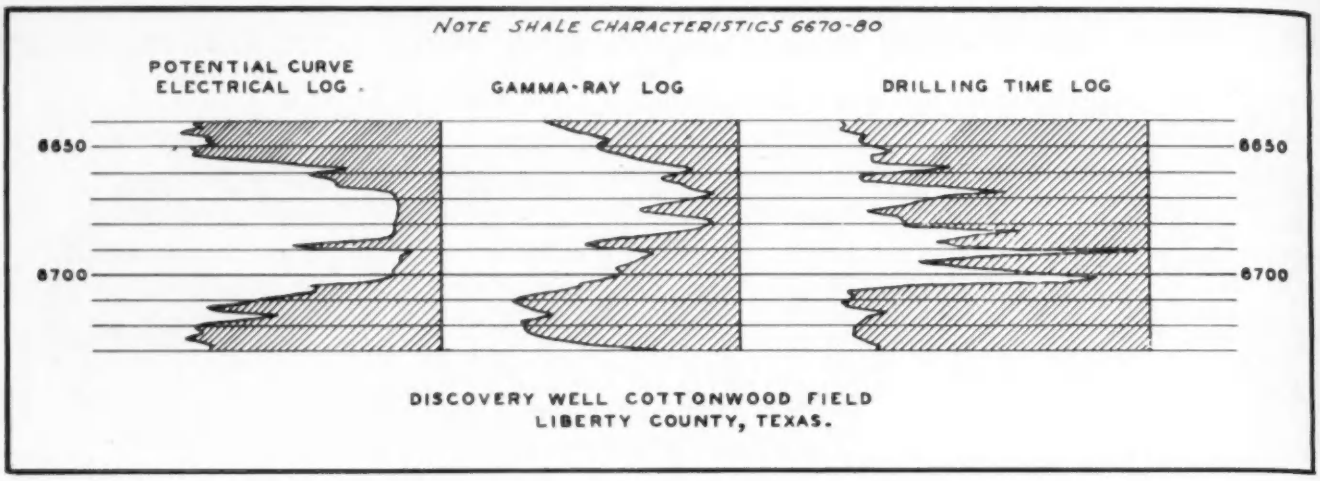

FIGURE 5

Comparison of Radioactive Characteristics of Shale to Other Lithologic Properties of the Shale as shown by its Rate of Penetration.

sand, the objective box is drawn on the map and the course of the proposed sidetracked hole is indicated by the solid line of the section. By correlating the upper sands, using drilling-time data, it will be known during the drilling of the sidetrack if the well is running too high and consequently would encounter the sand above the gas-oil contact; or if it is running too low and consequently would penetrate the objective sand too near the oil-water contact. The sidetracked hole can thus be controlled without having to make numerous electrical surveys and additional sidetracking also may be avoided.

Drilling Time Applied to Coring

Advance correlation with drilling-time logs greatly aids in selection of coring points, particularly when correlating with a well on which a drilling-time record has been kept. Our experience has been that coring is kept to a minimum with a much higher percentage of cored *sand* section than previously obtained. It is now our general practice to penetrate the objective sand for a distance of two to three feet before coring, identifying the lithologic break by the drilling-time curve. When it has been desired, however, to core the contact, correlation by drilling time has enabled us to reduce the amount of shale cored to a minimum, insuring use of a fresh bit in the objective sand. This has had one further advantage. Prior to time drilling it was frequently necessary to make an electrical survey to pick the coring point and after coring another survey might not be made for several days or until considerably more footage had been made. Now, eliminating the necessity of a correlation survey before coring, drilling time is used to pick the coring point and the electrical survey is made after coring saturation, so that the section is logged soon after the hole is made. This reduces the effect of mud infiltration and aids in correct interpretation of the electrical log. On the latest well drilled in University field, the tops of four sands, 9200, 9500, 9600 and 9700 feet were cored within 3 feet of the top of the first core in each sand. The first electrical log was run after coring the first sand, at 9242 feet, and no additional log was run until total depth of 9950 feet was reached.

Automatically timing cores not only gives a complete record of drilling time, but adds considerably to the time available for sleep when coring continuously with a wire line core barrel. The recorder enables the driller to keep accurate checks on measurement while coring and provides the geologist with data required to interpret any section of the core that may be lost. Value of this increases in a saturated sand section with interbedded shale, limestone beds or zones of low permeability. In many cored sections drilling-time data will yield more complete information than an electrical log only, because in these cases the degree to which the electrical log can be interpreted does not permit accurate calculation of the net sand thickness that will produce. Figure 7 shows the lithologic interpretation of a saturated sand section using all data available from cores, drilling-time, and electrical log. The crossed areas in the center column show where portions of the cores were missed, stressing the need for supplementary information. In the upper zone of the electrical log the sand stringers might easily be interpreted as being either low permeability sands or shaley sands of questionable productive capacity. Interpretation by drilling time and core examination shows that these upper thin sand stringers are as permeable and saturated as the thick section with the high potential kick. A check of the net thickness of productive sands in this case shows a total of 91½ feet from drilling time compared with 95½ feet from the electrical log, an ex-

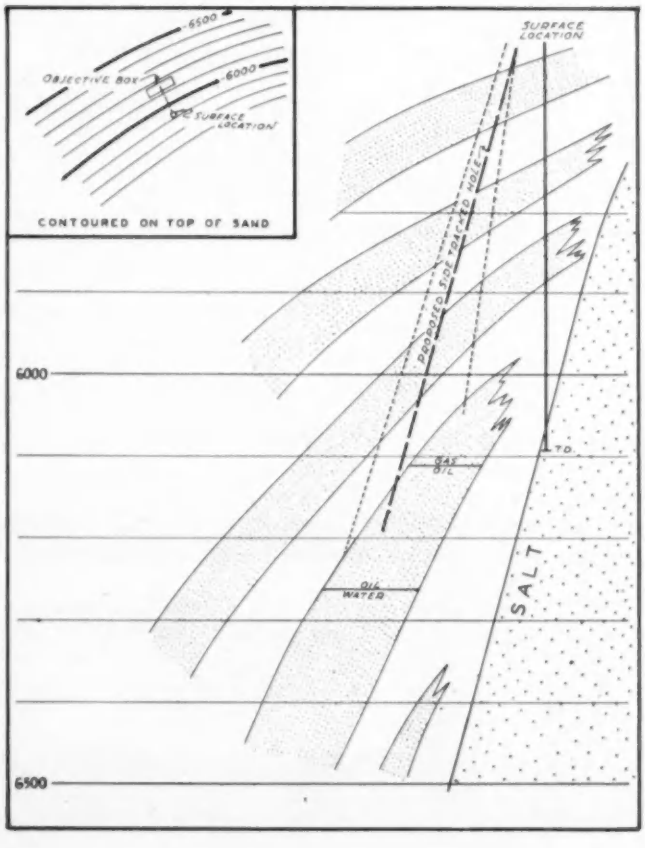

FIGURE 6

Use of Time Drilling to Control the Course of a Directionally Drilled Hole.

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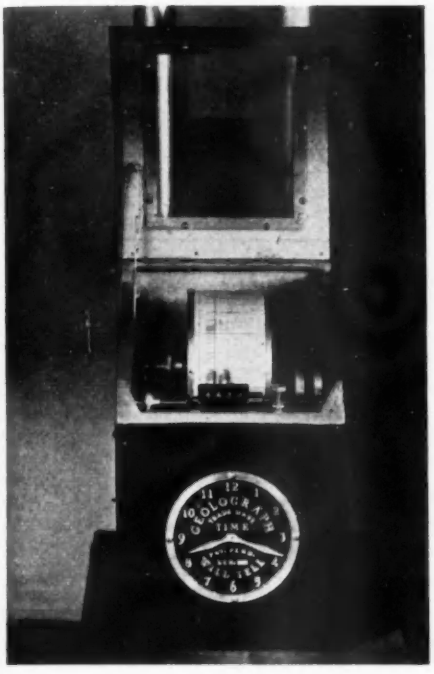

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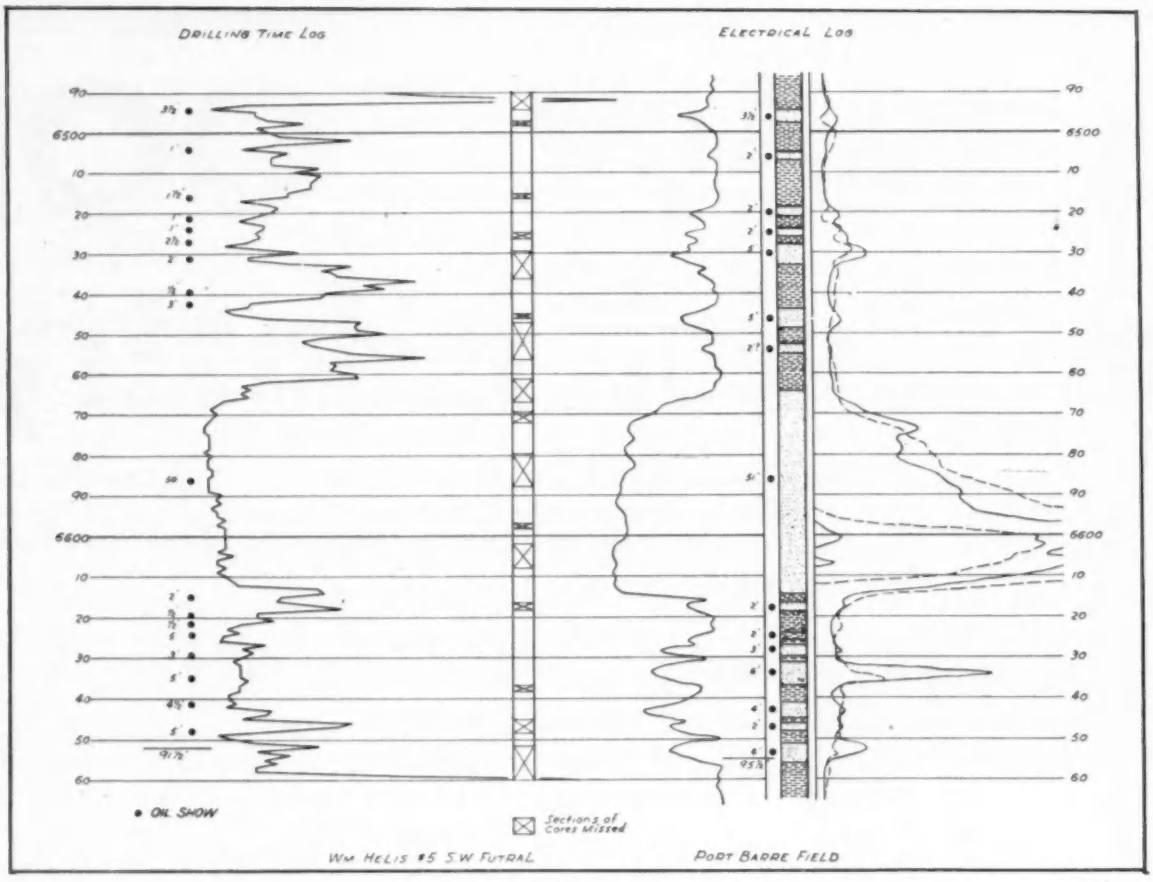


FIGURE 7

Use of Drilling Time Log in Coring to Determine Lithology of Missed Cores and Net Sand Thickness.

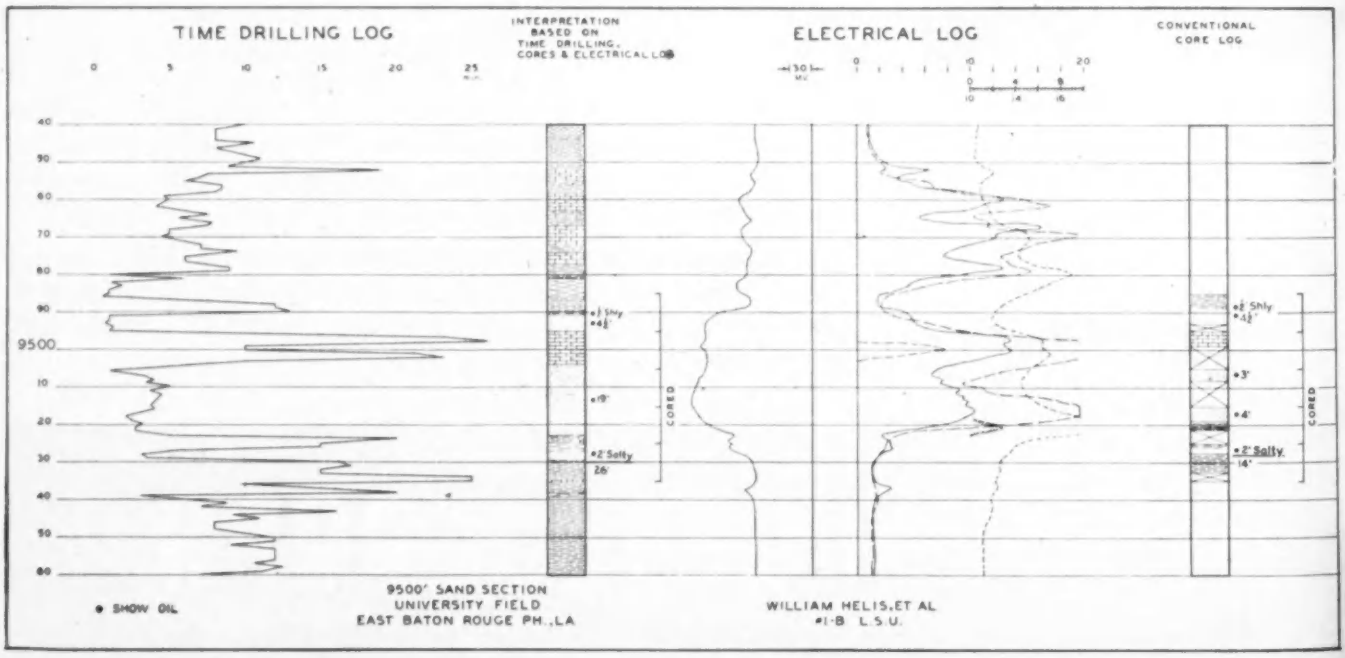
ample of close agreement between the two methods.

It is obviously more accurate to plot the lithology of a sand section with the use of a drilling-time curve than with the conventional method of plotting a core log omitting the litholgoy of the parts of the core that are lost. Figure 8 shows a comparison between core logs, one (in the center) with and one (on the right) without the aid of a drilling time curve. In this illustration again will be observed the extent to which the drilling-time log aids in the interpretation of the electrical log as well as in computing the net thickness of saturated sand. Twenty-six feet of sand are indicated by combining drilling-time data with the electrical log and 14 feet of sand only are indicated from the recovery of the cores. The interpretation of the high resistivity kicks caused by cemented sands and limestones is here aided by the use of the drilling-time log. In this case the estimate of net sand thickness from the electrical log and cores, without drilling-time data, would result in an excessive figure.

■ TO BE CONTINUED NEXT WEEK

FIGURE 8

Time Drilling Applied to Coring



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5 Sheave	31″	34¼″	49″	.....
6 Sheave	.....	38½″	49″	46¼″
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. . . Crude Oil Emulsions . . . Different Types and Treatment

Eighty percent of all oil produced requires treatment, this comparing with 20 percent 15 years ago. Conservative figure reveals cost of this processing approximates $36,000 daily

By R. R. MacDONALD, Oil Treater, Deep Rock Oil Corporation, Tulsa, Oklahoma

Q. What is an emulsion?

An original definition says an emulsion is "a liquid mixture in which a fatty substance is suspended in minute globules." Milk is an emulsion which contains droplets of butterfat in a water solution of milk, sugar and salts. Butter is an emulsion of water in butterfat.

A better definition of emulsion to suit the needs of the oil industry is "a suspension of fine particles or droplets of one liquid in another, the two liquids being immiscible in each other; droplets are surrounded by some colloidal or emulsifying agent."

Note the word immiscible above. Alcohol and water dissolve in each other in all proportions. They are miscible. Pure oil and pure water will not dissolve in each other. They are immiscible. When shaken together, the oil droplets will remain suspended temporarily but will soon coalesce, or run together and separate out as a layer of oil on the water. However, if each droplet of water or oil were surrounded by a film of some material such as asphalt, soap, resinous substances or naphthenic or other organic acids, which holds the droplets apart and prevents them from coalescing or running together, they will remain suspended indefinitely in the water or oil as the case may be. Such suspension of one liquid in another is an emulsion.

THIS paper, which was presented before the Drumright Chapter of the American Petroleum Institute's Division of Production, May 8, 1944, was prepared from questions submitted by members of the chapter, and covers practically the whole phase of oil treating.

Types of Emulsion

It might be well, here, to name the types of emulsion. First there is the most common, or "water in oil" emulsion. The liquid in an emulsion that is broken into droplets is known as the dispersed or internal phase, whereas the liquid surrounding the droplets is the continuous or external phase. In the "water in oil" emulsion we have a minute globule of water surrounded by a film of oil. Consider a golf ball, the cover representing the film of oil, water the rubber interior. Water is the dispersed or internal phase, oil the external or continuous phase. (Like butter—water in butterfat).

The second type, quite rare in crude oil emulsions, is the reverse of this. It consists of "oil in water" wherein the oil is the dispersed or internal phase and water the continuous or external phase. (Like milk—droplets of butterfat in a water solution of milk, sugar and salts).

The third type is still more rare. It is a dual dispersion, in which we find "oil in water in oil." In certain areas, e.g., California, where the oil is of high viscosity and high specific gravity or where the water is relatively soft and fresh, we find dual emulsions. Some have been found in the St. Louis area of Oklahoma.

Another dual emulsion, the "water in oil in water" type, may exist, but none has been found by the writer.

The different types of emulsions are illustrated in Figure 1.

Q. What makes one emulsion tougher to break than another?

It is the author's opinion that the size of the droplets dispersed, together with their respective surface tensions cause one emulsion to be tougher to break than another.

It should be brought out here that to create an emulsion four things are necessary. Namely, oil, water, an emulsifying agent and agitation. Without all present no emulsion can be formed. Oil and water are obvious. The emulsifying agent can be any of a number of things: It could be the various salts in the water, asphaltic or resinous substances, naphthenic or other oil soluable organic acids, or finely divided in-

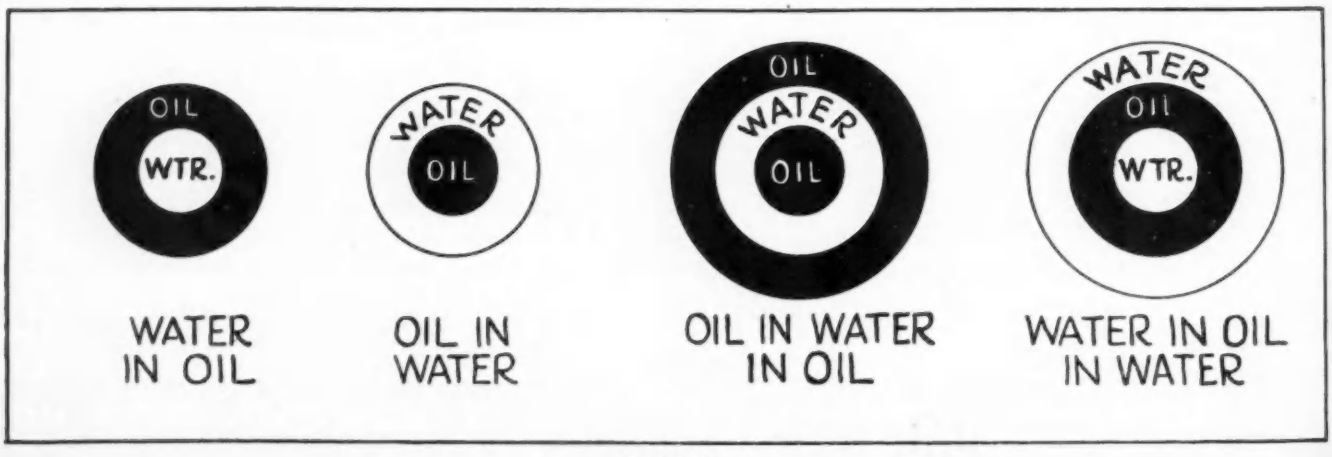

FIGURE 1
Different types of oil-water emulsions.

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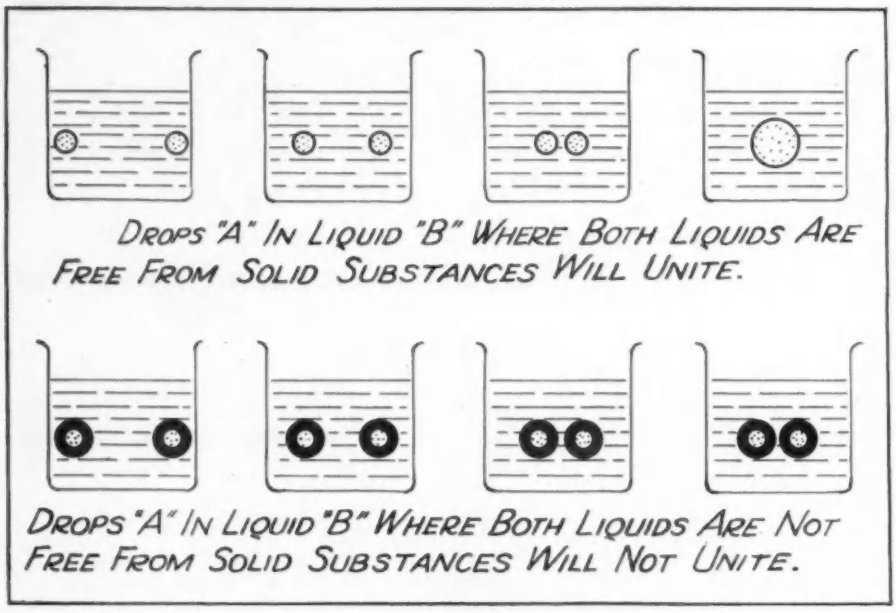
DROPS "A" IN LIQUID "B" WHERE BOTH LIQUIDS ARE FREE FROM SOLID SUBSTANCES WILL UNITE.
DROPS "A" IN LIQUID "B" WHERE BOTH LIQUIDS ARE NOT FREE FROM SOLID SUBSTANCES WILL NOT UNITE.

FIGURE 2

Diagram sketch showing why some emulsions are tougher to break than others.

soluable materials that are soluable, wettable, or dispersable more readily by the oil (the external phase) than by the water.

These continuous oily films of absorbed material are quite resistant and frequently can withstand considerable pressure and distortion without coalescing or running together. All processes for breaking crude oil emulsions try to neutralize or destroy the properties of these emulsifying agents.

Ratio of Specific Gravities

Returning to the size of the droplets in discussing toughness, one can readily understand the inaccessability of attacking millions of minute globules in a given volume, as compared with say ten larger ones filling the same volume. Let's compare a bushel of peas for one, to a bushel of basket balls for the other. While these are exaggerated extremes, they serve to bring out this point more clearly.

Another point of equal importance with regard to size is the ratio of the two specific gravities to each other. The smaller the globule, the more equal are the specific gravities of the water in the oil. The larger the globule, the greater is the specific gravity of the water to the oil in volume. The peas and basket balls illustrate this point in that the films on the peas in bumping together will not break allowing coalescence nearly as easily or rapidly as the same films covering basket balls. The greater volume of water with its corresponding greater weight, in this sense, tend to burst of their own accord due to the extreme difference of specific gravity of the water over the oil in the film surrounding it.

Little has been written on surface tension between the two liquids. When surface tension of a liquid is spoken of, reference is generally made to tension at its surface of contact with air, or free surface, but in many cases not this, but tension at the contact surfaces of two immiscible liquids comes under consideration.

Pure refined oil and distilled water upon agitation will not emulsify. Impure oil or crude oil and salt water or oil field water upon agitation will emulsify. The character of this emulsion may vary greatly. With a gassy crude oil containing little resinous matter and the agitation not too violent the emulsion has the appearance of a mass of foam and consists of large droplets of water which are contained in a network of films of oil.

When viscous, dead and heavy oils are subjected to prolonged and vigorous agitation, creamy emulsions are formed. Under a microscope these emulsions show countless minute droplets of water swimming in the oil in close proximity to each other. Besides these two typical emulsions, many intermediate varieties are possible.

When two drops of a liquid "A" floating in another liquid "B" approach each other, there remains between them, before they come into actual contact and unite, a layer of the liquid "B" growing thinner and thinner. (See Figure 2). If the liquids "A" and "B" are both free from dissolved solid substances, the very thin film of the liquid "B" that finally separates the two drops of the liquid "A" is easily broken down by the force of surface tension at the limiting surface of the two liquids, and the two drops of "A" come in contact and unite. The case is different, however, when one of the two liquids contains a solid substance in solution which decreases its surface tension with respect to the other liquid. In this case the surface layer of this liquid must become a more concentrated solution of the dissolved substance, and by this means on the limiting surface of the drop "A" thin films may be formed of sufficient stability to withstand the disruptive action of the surface tension, and by these films the fusion of the drop "A" will be prevented.

Films With Stability

Such film forming substances in crude oil are found in the asphaltic and resinous compounds on the one hand and in the soaps of the naphthenic acids on the other.

We have a concentration of asphaltic and resinous substances as well as naphthenic soaps at the limiting surfaces of crude oil in water. This may be proved by actual tests, i.e., by the agitation of a dilute solution of petroleum resins in benzine with water. After agitation has ceased, there remains between the benzine solution and the water a considerable layer of emulsion of honeycomb structure, consisting principally of angular, relatively large cells filled with water, their walls consisting of thin films of oil. That these films possess considerable stability is shown by the fact that they sustain small pieces of glass thrown on them without breaking.

Such behavior of the emulsion films strongly suggests that they do not consist of the original benzine solution, but are concentrations of solid resinous substances. This may be proved by analyses of the benzine solution before and after agitation with water. In one experiment, the resin content of the solution fell after agitation with water from 1.015 percent to .998 percent.

Summing up the part that surface tension plays, we may say that the stronger the bond, attraction, affinity or even stickiness of one molecule for another in this film surrounding the globule of water, the more stable becomes the emulsion. The weaker the surface tension, bond, attraction, affinity or even stickiness of one molecule for another, the less stable is the emulsion and more easily broken. The stronger the bond, the more stable. The weaker the bond, the less stable.

Causes of Emulsion

Q. What causes emulsions?

The basic cause of oil field emulsion is forcing, under pressure, oil and salt water through a small orifice. This includes flowing, slippage while swabbing, pumping with worn balls and seats or worn cups, producing with either air or gas lift. The oil actually entering the well reservoir has been found "cut" where salt water has been produced with it from being forced through the formation by pressure of either gas or water drive. These emulsions can be reduced but they cannot be prevented. They can be lessend with renewed balls and seats, by replacing worn cups, by not over-pumping or pounding, and by efficient gas anchors. One of our worst offenders in cutting oil, is a worn pumping barrel or plunger in the metal to metal type pump, or a combination of both worn barrel and plunger. These pumps set to .001 clearance between the plunger and barrel will not cut oil in our Drumright area. Yet when they wear until there is .003 clearance, slippage will occur causing the oil to cut. It is surprising, yet nevertheless true, that this same pump worn to .003 could be used in the Seminole area without slippage, or as a result the oil cutting. Individual units, stroke and number of strokes per minute explain this.

The correct size of the pump for the individual well comes next in importance for reducing "oil cutting." This prevents churning. The correct "placement" of the barrel in the well is equally important.

Suppose a well is equipped with an 1½-inch barrel pump set in the con-

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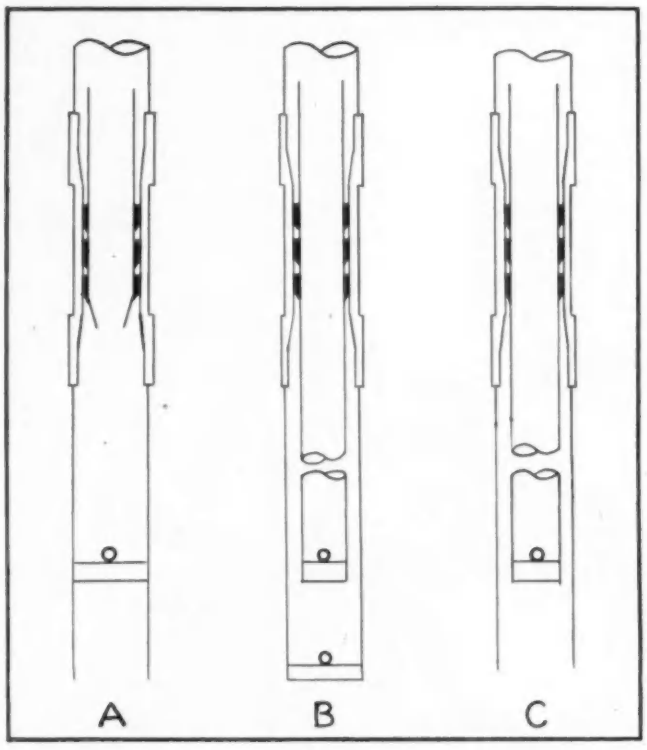

FIGURE 3

Different type pump settings. Drawing "A" represents bottom hold-down above standing valve (conventional setting). Drawing "B" shows top hold-down with lower standing valve and second standing valve (wet string). Drawing "C" shows top hold-down and lower standing valve without second standing valve (dry string).

ventional way, with a bottom hold-down above the standing valve, (see section A of Figure 3) and that this well pumps off in seven hours. In numerous cases, by reducing size of this barrel to say 1-inch or 1 1/16-inch and underslinging the barrel so that there are a top hold down and a bottom standing valve, not only is the "oil cutting" reduced but in many cases the production has been doubled and even tripled. Lowering the pump in the fluid level enables longer pumping which explains the increased production. It is obvious that this procedure cannot be used in all wells due to "floating sand" among other reasons, and that the main disadvantage where it can be used, is that you have a "wet" string of tubing to pull when this becomes necessary, but where possible the reduced "cut oil" and increased production more than pay for the disadvantages of the "wet" string. (See section B of Figure 3).

There are two schools of thought on this "wet" string of tubing. Some don't want to drop fluid where there is a bad caving condition. Some don't want to "roil the fluid in the hole by dropping the fluid. Some *want* to drop the fluid so that it *will* "roil" the fluid in the hole, and wash the face of the sand. In either case this can be accomplished by setting a lower standing valve that will hold when tubing is pulled or leave it out, and use only the standing valve on the lower end of the pump that will come out with the pump as it is pulled.

Explanation of "Slippage"

A few figures will help explain the reason for "slippage," causing the oil to cut it. The hydro-static pressure exerted per square inch on balls and seats, working barrel plungers, etc., in a 4000-foot well where the oil is 40 gravity is 1427.54 pounds! The pressure of "average" salt water, where the tubing is full of water, is 1605 pounds! Where the oil is cut with from two to 90 percent water, the figure is somewhere between these two accordingly. With these figures, you can readily understand why replacing worn-out balls and seats, cups, pumps, etc., will reduce cutting.

Q. What is the best method of treating cut oil?

This question includes all methods because the best method in one area might not do or be too costly for another area. Of course chemicals are necessary.

"Loose" Emulsions

Generally speaking, the best method where there is a loose emulsion, such as the Drumright, Oilton area, treating cold is sufficient. Pumping wells in 90 percent of such cases have looser emulsions than flowing wells. The exception in this area is at Bristow where there are lower gravity, black Dutcher wells. These are extremely tough, and in most cases require a higher ratio of chemical per hundred barrels of oil plus addition of heat to break them, as compared with other pumping areas.

In the Drumright-Oilton area where there is an abundance of free water together with the "cut oil," a gun barrel or settling tank is usually sufficient to handle the water. On leases in this area where there are from two to twenty or more wells, chemical proportioning pumps are set at from one to three or four of the worst wells, the oil from all wells, usually joins at a "header" and all of the oil takes advantage of the chemical from the few equipped with chemical pumps. In some areas, in treating cold, the oil inlet to the settling tank instead of going up and in at the top of the tank, is sometimes put in at the bottom and the oil is allowed to filter up through some six or seven feet of water through a siphon arrangement. This water wash tends to facilitate coalescence.

Heat's Role

Where heat is necessary, a heater is usually built onto, or into, this settling tank. Where production warrants, or the emulsion demands, any number of treating tanks and systems are available on the market. A few words on heat should suffice in explaining the part it plays. It brings about a physical change in that when the small globule is heated, it expands and in expanding or growing, the film surrounding it becomes thinner and thinner, with this thinning, its viscosity is also reduced from the action of the heat. This goes on until the small globule of water breaks through the film of oil surrounding it from its greater specific gravity, and joins those next to it that are also expanding and bursting. These in turn join and form larger globules that from the same action expand, break and finally coalesce, the water falling to the bottom, the oil rising to the top. Heating also lowers the viscosity of the oil, facilitating the dropping of the water and it also increases the gravity differential between the oil and water.

Treating methods in Kansas, Illinois, and Texas are similar to those in Oklahoma. In various fields in Kansas where there is no gas to heat with, the emulsion is usually not very tight due to the fact that there is no gas. There are some exceptions. Where heat is necessary in Kansas and gas is not available, oil burners are used.

Emulsions in Illinois are, generally speaking, not as tight as those in Oklahoma, as is proved by the chemical to oil ratio. Texas like Oklahoma, has both loose and tight emulsions. In California and along the Gulf Coast, there are numerous electrical dehydration plants with this basic principle.

Electrical Dehydration

Coalescence is the result of the mutual attraction of adjacent globules which under the influence of the applied electric field have a tendency to line up between the electrodes with oppositely charged portions of adjacent particles in close proximity to one another. The electrostatic attraction between particles is sufficient to rupture the separating films as particles come in contact with one another. The coalescence, or joining together of adjacent particles continues under the influence of the electric field until the resulting drops are large enough to settle out of the oil by gravity. The potential used depends on the di-electric characteristics of the emulsion.

Chemical and heat are sometimes used in connection with "electrical dehydration" to facilitate dehydration.

Another method, "treating down the hole," is used extensively in the Beebe Field. Dilute solutions are dumped periodically in the annular space between the tubing and casing. One advantage of this system is that the emulsion is treated under its natural tem-

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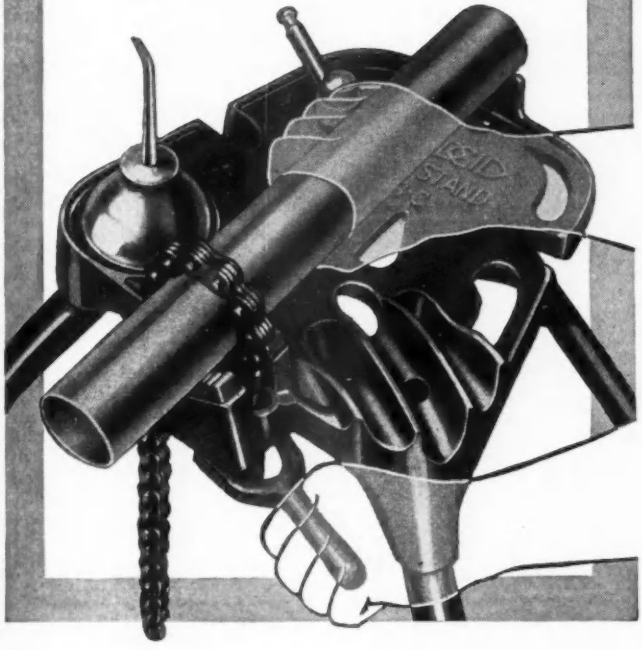

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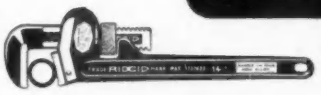

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perature and pressure. A "soap" is added to the emulsion before it reaches its worst state and in so doing, the surface tension of the agent or agents causing emulsification is lowered. Thus "you grease the small globules so that they will slide by!"

When a well starts cutting before treating equipment has been installed, rolling chemical into the oil with the use of gas, or where gas is not available, the exhaust of a car or truck will often get an operator out of trouble. This is not recommended as a general practice both from a safety point of view and the abuse to the car but can be used in an emergency.

The oil in the tank is started rolling from the action of the gas. Chemical is then poured in, in the smallest stream possible, the amount of chemical varying with tightness of the emulsion. The rolling is continued while samples are cetnrifuged until the basic sediment has been broken into water which will settle out after the rolling has been stopped. Some tanks can be rolled with as little as a quart of chemical per hundred barrels of oil. Others will require as much as a gallon of chemical per hundred barrels of oil. The amount of chemical used is determined by the grind out. As the basic sediment content is lowered and clear water increases, the chemical of course is reduced until a complete "break" is brought about.

Q. What is the best way to treat tank bottoms?

On leases where there is treating equipment, it is quite simple to pump them through the treating tank.

The best method where treating equipment is not available is to bury an old tank—one not good enough to use as a storage tank—at the end of the draw-off box. Into this you can accumulate the draw-off or the draw-off from tanks that have had to be cleaned. When this sump tank becomes full, it can be pumped over into a stock tank and rolled. Chemicals have been developed for just this purpose, destabilizing tank bottoms.

To show how this sump tank will pay for itself many times over, let's assume that an old 250-barrel tank is buried. Into this we can accumulate eight tank bottoms, 12 inches each or 30 barrels from eight 250's.

Sump Tank Method

In cleaning a 250 with an ordinary 12-inch shut-off, the tank has been refused when there is 8 inches of the 12 inches basic sediment. This on the face of it gives 4 inches of good oil (or 10 barrels). Of the 8 inches basic sediment, there will be recovered an average of 25 percent marketable oil or 2 inches more. The remaining 75 percent will be water, mud and floating sand. But we have recovered 6 inches of marketable oil per tank from eight tanks or 120 barrels. Since these tanks will have to be cleaned whether we save the draw-off or not, we will not charge tank-cleaning to this oil, but in moving it back to stock, we should accept that cost plus the cost of the chemical used in cleaning it. Twenty dollars will more than pay these costs, leaving $100, using even $1 per barrel, which is conservative, per sump tank treated. Just a few of these will pay for burying the sump tank.

Q. What relation should there be between the amount of oil to be carried in a receiving tank and the amount of water for best treating results? How long should the oil be allowed to remain in the receiving tank?

In a treating-tank the water, definitely, must be carried well over the firing tube from a safety point-of-view. It has been the writer's experience that six to seven feet of water is sufficient, that the more settling space you have over the water, the dryer will the oil be going into stock. The rule here would be "the looser the emulsion, the less settling time or space required; the tighter the emulsion, the more time and settling space is required." The time oil should be allowed in a treating or receiving tank is controlled by the tightness or looseness of the emulsion plus the size of the tank and the amount of oil going through.

Because of the varying character of emulsions, no definite rule can be laid down wherein a given-size tank will treat, say, 500 barrels of emulsion daily. At Wewoka some few years ago, as much as 1200 barrels daily, of oil cuting 25 percent were treated to .4 percent in a 210-barrel welded treating tank at a temperature of 120 degrees and using chemical at the ratio of one gallon to 300 barrels of oil. Yet on another lease less than a mile away there is an emulsion that requires a 210 to handle less than 50 barrels daily at a higher chemical to oil ratio.

Q. How do you handle a crude having salt crystals?

This question is becoming more important daily. The best method developed so far is to heat the oil to a temperature sufficiently high to melt the asphaltic or paraffnic coating from around the crystals of salt, wash the oil with fresh water which takes up the salt, and is then broken out.

Salt Crystals Problem

In the relatively new, Moore Field, Gulf Oil Corporation had a well making 300 barrels of oil and 1100 barrels of water daily. The oil carried as much as 50 pounds of salt per 1000 barrels of oil. To eliminate this, the addition of 100 barrels (aproximately 10 percent) of fresh water daily at the trap cut the salt content from 50 barrels per 1000 barrels to between 12 and 18 pounds per 1000 barrels of oil. A de-stabilizing chemical was added at the well.

The Cushing Refinery had considerable trouble with salt deposit in its heat exchangers. Seventy percent of the trouble was eliminated by creating an emulsion using 5 percent fresh water and then a de-stabilizing agent to break this emulsion, the fresh water taking up the salt.

Q. What treatment is there for removing paraffin in tubing?

Several methods have been tried, some partly successful, others unsuccessful as follows:

1. Circulating hot oil.
2. Lowering an electrical heating element and melting the paraffin.
3. Mechanical scraping (which in the last analysis serves best).
4. Use of heat-creating chemicals (aluminum, magnesium, and possibly some sodium and potassium and water). These are not recommended unless precaution is taken to remove the residue before it cools and congeals.
5. A widespread use of chemical solvents. a.) Chiefly carbon-tetrachloride. b.) Carbon di-sulphide. c.) Tri-chlor-ethylene.

Carbon di-sulphide is perhaps most effective when an operator can get it to the paraffin. That is difficult and also the most dangerous because of its low flash point. It is a great fire hazard and should not be used by anyone not trained for that purpose.

Carbon tetrachlorides have carbon di-sulphide in them but the flash point has been raised to make them safe to handle though the efficiency has been sacrificed somewhat.

Tri-chlor-ethylene, all in all, is the most effective solvent, everything considered. There are no fire laws banning its storage, and it will not burn, but as mentioned above, the great difficulty lies in getting these solvents to the paraffin. The usual procedure is to unseat the pump, drop the fluid and then pour in the solvent. On reseating the pump and starting the well pumping, the fluid is allowed to come to the surface. When it gets to the bleeder, the well is shut down for from eight to twelve hours to allow the solvent to do its work. Where this solvent will go down, it is quite effective, but often you can't get it lower than 300 or 400 feet.

Portable "Re-cycle"

Phillips Petroleum Company at Fittstown had a truck equipped with pumps and a tank to do only this work, circulating a "re-cycle" oil. The "re-cycle" had a rather effective solvent action and cost but four or five cents per gallon. They would hook up to a well, circulate it until they loosened or removed the paraffin, leave and go on to another well. The "re-cycle" they would leave in the well would be pumped out with the production and sold along with the oil so they would get at least half of their money back plus elimination of the paraffin.

The ease or difficulty in removing paraffin when it can be reached lies in the amount of asphalt in the paraffin. Asphalt is the binder that holds the paraffin or heavier hydrocarbons together. It is this binder that it attacked rather than the paraffin itself by these solvents. The greater the percentage of asphalt, the easier it is to treat.

Paraffin itself means "without affinity." In a broad sense, it will not "join up," or combine with anything.

Q. What is the treatment for "gyp" in a well?

"Gyp" as we speak of it fouling our wells is usually the combination of a number of salts — calcium carbonate, sodium chloride, calcium sulphate, magnesium oxide, and sometimes a little sulphur.

Usually there is a fair percentage of calcium carbonate that will react with the ordinary commercial acids used in acidizing, hydrochloric acid. If the percentage of calcium sulphate, which is chalk or plaster of paris, is high and which the acid won't touch, the acid will destroy the lower percentage of calcium carbonate allowing the "gyp" to break up and wash away.

There are some wells 10 miles east of Bristow in which perforations were "gyped" up. The operators dumped from one to three drums of commercial acid with an inhibiter, in each well, then poured in fresh water to destroy any possible after effects of the acid, and increased production from five to twelve barrels per well. The effect of

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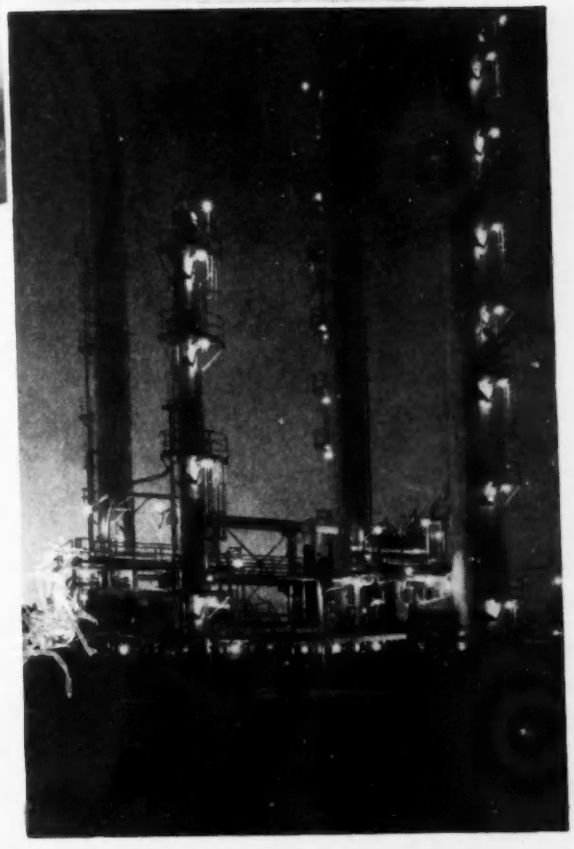

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FIGURE 4

Sample of Report Sheet on Cost of Treating Oil, March, 1944

LEASES	No. of Wells	Fluid Treated: Cut Oil	Fluid Treated: Water (free)	Draw Off	Oil Recovered	Percent Oil Rec. Cut Oil	Chemic. Used: Gal.	Chemic. Used: Type	Cost of Chemic.	Equip. Deprec.	Type of Equipment	Super Cost	Total Treating Cost	Cost Per Barrel Recovered: Chemical	Cost Per Barrel Recovered: Equipment	Cost Per Barrel Recovered: Super	Cost Per Barrel Recovered: Total
Doe, John	3	5445	1089	0	4329	80	23¼	Y	49.99	10.00	210 HCP	5.78	65.77	.0115	.0023	.0013	.0151
Roe, Richard	14	5269	0	12	4955	94	15½	YP	33.32	6.75	200 HCP	5.78	45.85	.0067	.0014	.0012	.0093
Total	155	154077	381232	107	84880		351¾		756.27	73.75		$100.00	$930.02	.0089	.0008	.0012	.0109

Where under "type of equipment" heading: H—Heater.
210—Capacity of tank in barrels.
CP—Chemical pump.
Chemical cost figured at $2.15 per gallon, including freight and expense of moving to various leases.

acid may be determined by trying a drop or two on a sample of the gyp.

Q. After drilling in a wildcat or outpost well, pipe line companies take from five gallons to fifteen gallons of the oil before a pipe line is laid. Why?

With a small still and a small vacuum still they can pre-determine almost the exact value of this oil with regard to gasoline and lube oil.

Two cuts are taken which are called key fractions 1 and 2. One at atmospheric pressure (approximately 740 MM) at from 250-275 degrees Centigrade, (482-527 degrees Fahrenheit.)

The other at 40 MM or 700 MM lower than atmosphere at from 275 to 300 degrees Centigrade. The gravities of these two cuts are then taken and will fall in the following schedule determining their value:

	Key Fraction 1	Key Fraction 2
Paraffin	40 or lighter	30 or lighter
Paraffin intermediate	40 or lighter	20-30
Intermediate paraffin	33 to 40	30 or lighter
Intermediate	33 to 40	20 to 30
Intermediate naphthene	33 to 40	20 to heavier
Naphthene intermediate	33 to heavier	20 to 30
Naphthene	33 to heavier	20 to heavier

If that particular pipe line company wants a lube oil, this tells them. If they want some other end they can tell definitely from this fractional distillation. The corrected gravity taken when tanks are sold merely tells the value of the oil.

Q. What are the basic principles used to treat paraffin base oils and asphalt base oil? Which base is the most difficult to treat? What is the comparative cost of treating the two types of oil? What is the geological explanation of the different oil base?

Strictly speaking, paraffin base oils do not emulsify even though violent agitation occurs, as readily as asphaltic base oil.

There are few emulsions found in Pennsylvania where there is "so-called" paraffin-base oil. Yet there are many emulsions in California where we have the "so-called" asphaltic-base oil.

The Mid-Continent, with its mixed base oil, is where there are so many varied emulsions, both tight and loose.

Hot Water Chemical Wash

In the Mid-Continent field the procedure is the same for those oils of Bristow, which have a higher percentage of asphalt and those of Seminole which have a higher percentage of paraffin, and that is the hot water chemical wash. In comparative cost of treating these two oils, the asphaltic is much higher than the paraffinic and too, the asphaltic requires much higher temperatures in treating than the paraffinic. However, the higher temperatures required for the asphaltic do not hurt them as much as the paraffinic because they are of a much lower gravity to start with.

As to treating temperatures, in a closed, gas-tight system where oil is cooled before it is turned to stock, higher temperatures will not hurt the oil more than summer temperatures. But to turn hot oil into stock that is not gas-tight, invites great loss, as the lighter fractions go off first. This losing of the lighter ends is further accelerated by wind blowing over the tanks. It has been estimated that the loss of one degree gravity includes a loss of 2½ percent by volume. Remember stock tanks of twenty years ago? They were wood and open at the top and it was accepted that an inch a day would be lost from "shrinkage." This "shrinkage" was lighter and most valuable ends going off in the atmosphere.

Tank Development

Building sheds over these batteries of wooden tanks to keep off the sun helped. Then came steel tanks with tops which was a big step toward not merely holding gravity, but volume as well. Now welded tanks are not only gas-tight but they can hold a pressure of some two ounces. There also are wooden tanks in which can be held pressure plus the water seal down the staves to prevent oil from going through the wood, to use in areas where there is corrosive action of both salt water and gas. There are differences of opinion on the merit of the water seal. Some still demand these tanks.

In regard to the geological explanation for the different oil base, this goes directly back to the widely discussed, but never settled question of the origin of oil. Both limited time and knowledge will prevent the writer going into this subject but here are a few pointers.

All oil, whether asphaltic or paraffinic, is made up chiefly of the two elements, hydrogen and carbon. Too, there is some nitrogen and sulphur in small amounts. The main difference between paraffins and naphthenes or asphalt is the higher ratio of hydrogen to carbon. The more hydrogen per unit of carbon, the more paraffinic. The less hydrogen per unit of carbon, the more naphthenic or asphaltic.

Butane is a pure paraffin—C_4 H_{10}. Benzene, C_6 H_6, is an example of the naphthenic group.

The ratio of carbon to hydrogen in this aromatic is the same, but the ratio of hydrogen to the carbon in paraffin is twice as much plus two, as in all paraffins.

Factors that might explain the geological difference between paraffin and asphaltic base oil, whether the organic or inorganic origin of petroleum is accepted, are age, heat, pressure, filtration, catalytic, and, a combination of any or all of the above.

By varying the degree of age, heat, pressure, catalytic change or filtration, the difference between paraffinic and naphthenic base oils can be accounted for. Some hold that the paraffin base oil in Pennsylvania, through time and pressure, originally came from the asphaltic deposits in Ohio; that through filtration it lost the heavier asphaltic substances along the way. Others reject this. It may be explained by any or all of the above factors.

Q. What items should be included in arriving at cost of tregting oil?

For a complete picture, one report form is shown in Figure 4.

Conclusion

Fifteen years ago but 20 percent of all oil produced, required treating. Today it is stated on good authority that nearly 80 percent of all oil produced requires treating. Fifteen years ago, oil was accepted up to 3 percent and nothing was said about whether it was water or basic sediment. Today oil will not be accepted over 1 percent. And this one percent cannot have .4 water. This means that a tank grinding out .6 basic sediment and .4 water will be refused.

Too, in some fields where a tank is accepted at .7 basic sediment and .3 water, the oil grinding out this much cannot carry over 20 pounds of salt per 1000 barrels of oil.

Percentages are sometimes confusing. The daily production for the United States during a recent period was 4,532,155; 80 percent of this, amounting to 3,625,724 was treated.

Using the above, a conservative figure of approximately one cent per barrel or $36,257.24 was spent each day for treating oil.

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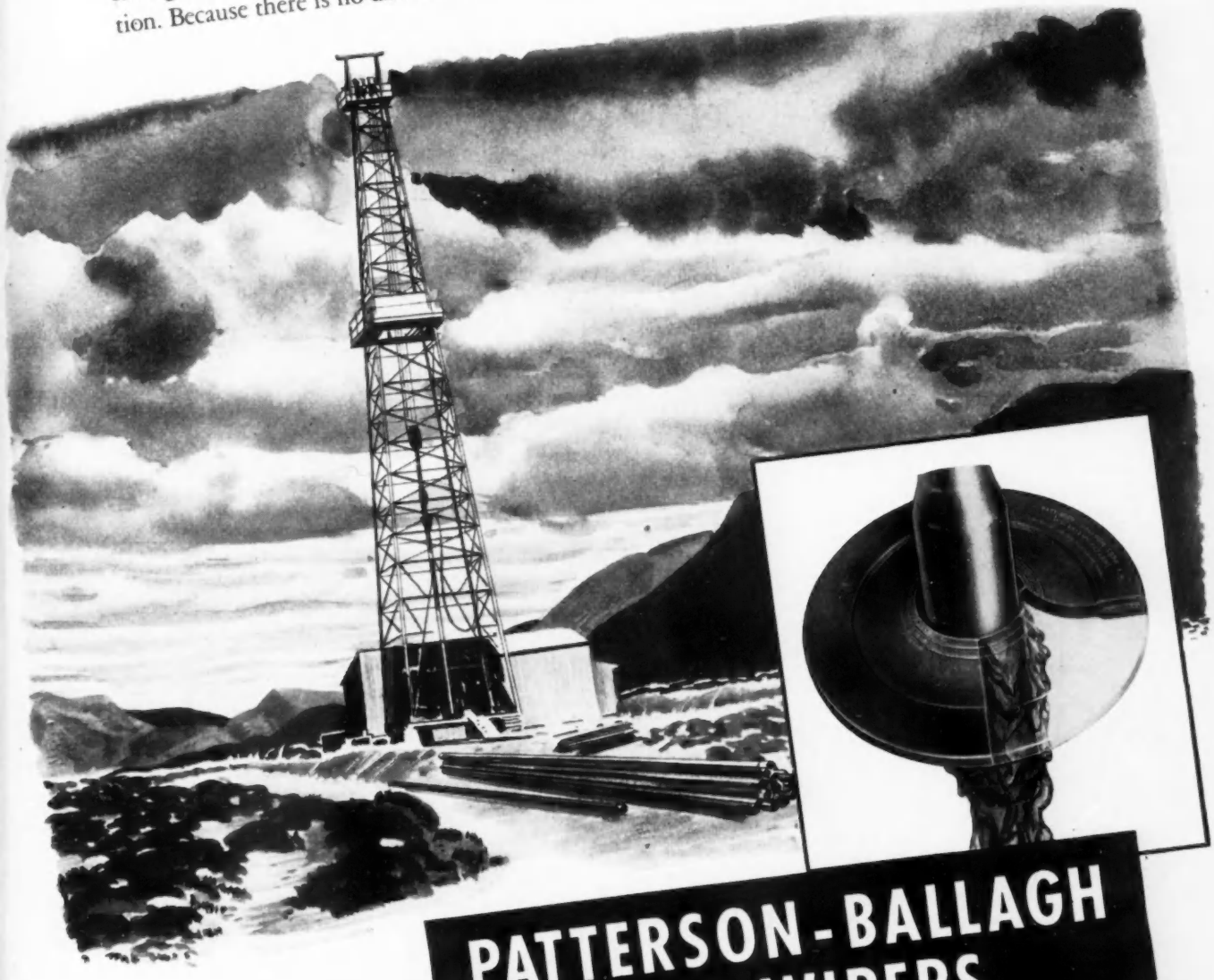

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Electronics In the Oil Industry

Principles involved in electronic and amplidyne control are simple and easily understood and no one need be overawed by the names themselves. These types of control obtain both new results and better ones than ever before recorded with no inference, however, that they are to replace all established and successful devices

By W. G. TAYLOR, Petroleum and Chemical Section, Industrial Engineering Division, General Electric Company*

ELECTRONICS is nothing new. Industrial applications of electronics have been made for more than 20 years. More recently, the field and use have been expanding rapidly, which accounts for a large amount of publicity. To engineers, electronics is just another tool available for selection when it will accomplish something better than other tools at hand. There is another new tool which will be described later.

Use of electronics is virtually just beginning in the oil industry, and so this discussion has been planned with the idea of giving the oil industry something to think about for the future and help enable a job to be done better.

Electronic tubes either have a high vacuum or are gas filled. In industrial electronic applications the gas filled, three-element tube called the thyratron is needed because of its higher current carrying capacity as compared with that of the vacuum tube. The capacity of the vacuum tube is measured in terms of milliamperes and only a gas-filled tube has enough capacity to carry sizeable control or motor current.

The electronic tube usually acts as a rectifier, an amplifier, or a switch, and often plays only a small port in the circuits of the electronic devices where it is used. The major parts which often give such circuits their chief characteristics are transformers, resistors, reactors and capacitors, without the use of which the electronic tube is comparatively helpless. It is not the intention, however, to describe the details of how these circuits are put together, but rather to indicate how a few of the results are obtained.

Digest from a paper presented at the 17th Annual Conference of the Petroleum Industry Electrical Association and the Petroleum Electric Supply Association, Dallas, Texas, April 19, 1944.

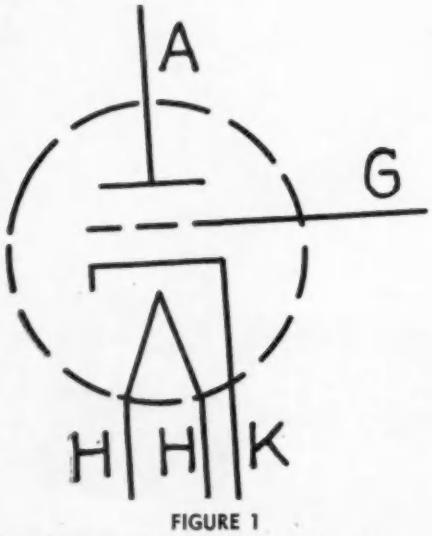

FIGURE 1
Diagram of industrial electronic tube.

Electronic Control in Tube

Figure 1 shows a diagram of the industrial electronic tube. Fundamentally, it contains three elements, the cathode (K) heated by a filament (H), the anode (A) and the grid (G), although others are added for various purposes under different conditions. The cathode has the property of emitting electrons when it is heated, and these travel through the vacuum, or any gas which may be in the tube, to the anode, and thus carry electric current through the tube. The fact that these electrons are relatively free in the space in the tube enables them to be controlled by the application of a potential to the grid. As the cathode is negative, a more negative potential on the grid will retard or stop the flow of electrons, while a positive potential will assist their flow. This is the fundamental principle of electronic control in the tube. The fact that a very small variation in the grid potential will make a large change in the flow of current from the cathode to the anode is the basis of amplification produced by the tube.

As electrons are emitted only from the cathode, the current carried by the electrons can flow in only one direction through the tube and therefore, when an alternating current is applied, current can pass only in one direction and the negative portion of the alternating current wave cannot get through. This is all there is to the fundamental action of the tube as a rectifier.

Figure 2 shows how the electronic tube may be used as a switch in an alternating-current circuit. The two tubes are connected in inverse-parallel, so that each tube carries one half of the current wave. When the potential on the two grids is sufficiently negative, no current will flow, and when it is changed to positive, the circuit will be established.

Compared with the contactors used in ordinary magnetic control, the electronic tube has no moving parts and is therefore inertialess and frictionless, and is controlled by a very small amount of power. It is easy to see, then, why electronic control is almost unbelievably fast and accurate and enables control response to be obtained by the action of minute currents or voltages or minute changes in control circuits. The absence of wearing parts reduces the attention required for maintenance and decreases the possibility of failure. Industrial type tubes are usually guaranteed for a year but the actual life is frequently more nearly three years or more.

Let us now consider a few of the industrial uses of electronics which appear to be readily applicable in the producing and pipe line divisions of the oil industry.

The electronic relay is a small, simple device — basically an electronic tube amplifier. It consists of a tube, a small transformer, a magnetic relay and a resistor for sensitivity adjustment, all enclosed as a unit in a case. It is useful in numerous applications, as it can be actuated by an extremely small current and serves to control a power circuit such as for starting and stopping a motor. A closed circuit resistance of as high as 5,000,000 ohms can be tolerated and still operate this relay, provided the open circuit resistance also is high, so that leakage across contacts or connecting leads will be too small to cause operation.

It is possible to use this relay to control liquid levels without use of a float, as is shown in Figures 3 and 4. Figure 3 shows a simple diagram for automatic maintenance of level in a conducting liquid. The circuit which actuates the

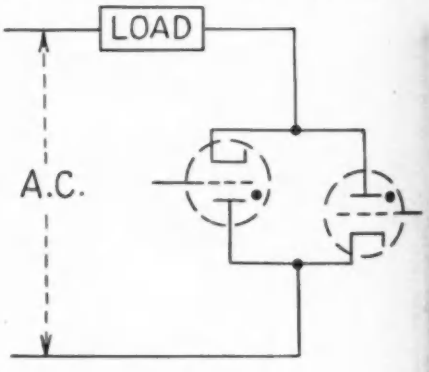

FIGURE 2
Two electronic tubes used as an alternating current switch.

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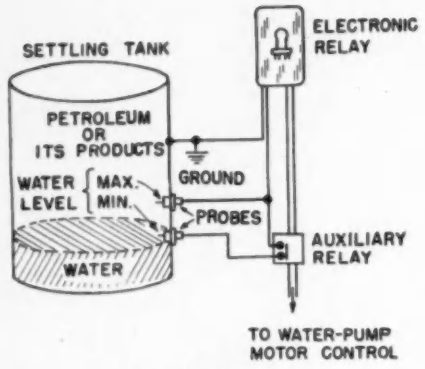


FIGURE 3

Use of electronic relay to control fluid level in tank.

electronic relay to start and stop a pump is opened and closed by the liquid contacting the probe. In actual practice some modification of this scheme would be desirable to avoid too frequent operation of the pump.

Figure 4 is a diagram of a circuit for automatically draining water from a settling tank. The contact shown on the auxiliary relay, connected to the lower probe, is normally open. When the water level rises to the upper probe, the electronic relay is energized to close the auxiliary relay and start the water-pump motor. The water level then falls, but the energizing circuit for the electronic relay is not opened until the level goes below the lower probe. The auxiliary relay is then opened, the pump is shut down and circuit conditions are re-established for a repetition of the operation.

Other advantages beside the elimination of a float mechanism are accuracy and quickness of response and absence of sparking at the probes in the tanks, due to the small amount of power used.

Other possibilities of this relay are conceivable in connection with oil field operations and are being investigated. This may eventually open up an interesting field.

Photo-Electric Relays

Most people no doubt know a lot about the photo-electric relay and have heard of its many uses. The phototube is an electronic tube in which the emission of electrons is produced by action of light on the cathode and varies in accordance with the intensity of the light. The cathode is not heated but is coated with light-sensitive material. One of the oil companies in California has used the

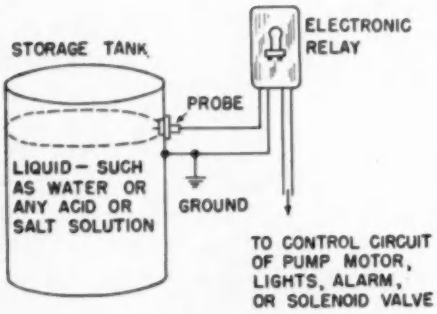

STORAGE TANK
ELECTRONIC RELAY
PROBE
LIQUID — SUCH AS WATER OR ANY ACID OR SALT SOLUTION
GROUND
TO CONTROL CIRCUIT OF PUMP MOTOR, LIGHTS, ALARM, OR SOLENOID VALVE

FIGURE 4

Use of electronic relay to drain water from settling tank.

photo-electric relay for liquid-level control to drain automatically water from lease settling tanks.

Another use of the photo-electric relay is to separate automatically leaded from ordinary white motor gasoline by diverting them to separate tanks when discharged from a pipe line.

Other applications are for burglar alarms, the control of illumination such as on a tank farm, for smoke detection and for counting, sorting, registering, paper perforations, etc.

One of the uses of electronics is in seismograph exploration work where electronic amplifiers are necessary to amplify the voltage generated by the geophones which pick up the vibrations of the earth produced by the explosion in the shot-hole.

Still another exploratory use of electronics is for well logging by measurement of earth potentials, or radioactivity, or of differences in electrical conductivity of the various strata. Electronic amplifiers form a very necessary part of this exploratory equipment.

Motor Control

Engineers often desire to have accurate control of the speed of their motors, their torque or their current, or perhaps all of these charactieristics. The power is generally alternating current, but direct-current motors have their limitations as far as such control is concerned. With direct current motors much more flexible control is obtainable, and yet they have limitations in some respects, such as accuracy of speed control. Electronics has permitted a direct-current motor to be run from an alternating current power supply with even better control of the motor characteristics than can be done with the ordinary type of direct-current control available.

Such electronic control equipment gives complete control of the characteristics of the direct-current motor when operating from an alternating-current power supply. It permits adjustment of speed and maintenance of that speed within an accuracy of about 2 percent or better at any load from no load to full load, as compared with 8 percent to 20 percent obtained with ordinary adjustable-speed direct-current drive. Either rising or dropping speed characteristics may be obtained if desired. The current input can also be controlled accurately, this being especially useful for current limit control during acceleration; and because torque is a function of current it can be controlled also.

Electrical engineers are familiar with generator-voltage or Ward-Leonard control of direct-current motors, whereby the motor speed is governed by changing the voltage on the generator, the generator being driven by an alternating-current motor or by a prime mover. Electronic motor control is basically this type of control with the generator replaced by electronic tubes acting as rectifiers. Take the motor away from the motor-generator set used in Ward-Leonard control, and everything else such as the generator, the exciter and the control equipment are, in such electronic control equipment, wrapped up in one stationary equipment mounted in a box. Such relays as are included function only in starting and stopping the motor. Once the motor is running, all control functions are obtained by electronic means and the armature of the motor is then the only moving part of the equipment.

The motor characteristics which are obtained are better and more accurate than those obtainable with ordinary generator-voltage control of a direct-current motor, and the overall full-load efficiency in small sizes is on the order of 10 percent to 15 percent better, this being due mostly to elimination of friction and windage losses in revolving machines and resistance losses in relatively heavy field rheostats.

Details of Control

Figure 5 shows fundamentally what is involved in such electronic control. A transformer is used to feed the tubes, one set of which rectifies current for the armature and another set for the field of the motor. Other and smaller tubes are used to obtain various characteristics desired. The knob for the d-c field is for adjusting the speed to any value desired. Once this is set at any selected position, the motor when started, will accelerate to the corresponding speed, which will be held automatically and accurately at that point as long as the speed setting remains unchanged. The

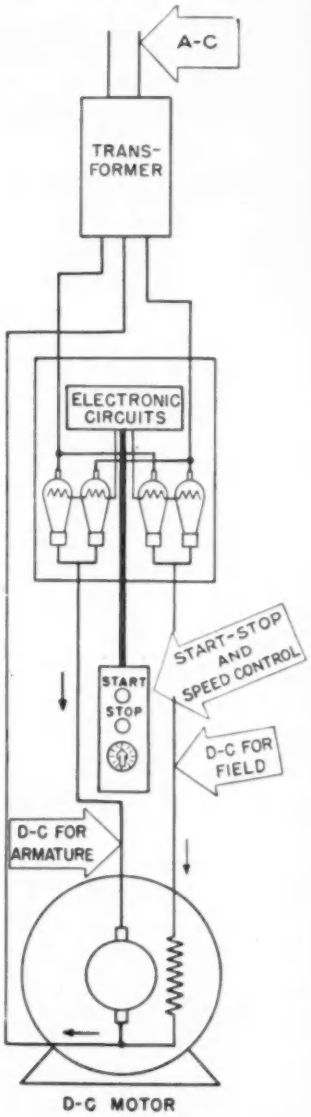
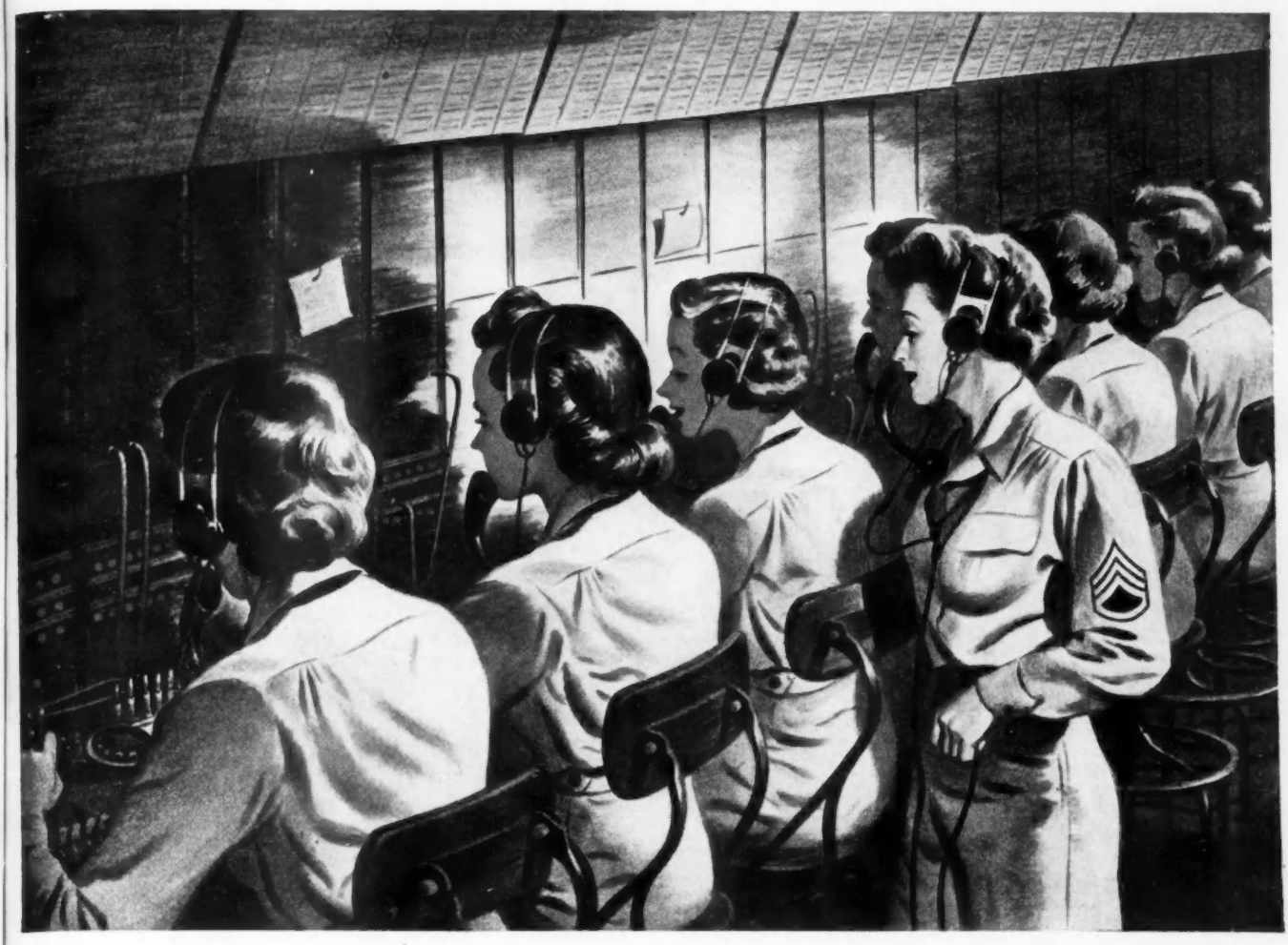


FIGURE 5

Fundamental diagram of electronic equipment for controlling direct-current motor run from an alternating-current supply.



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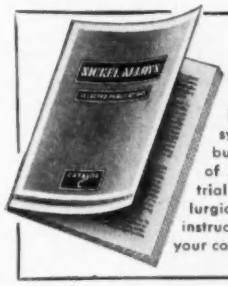

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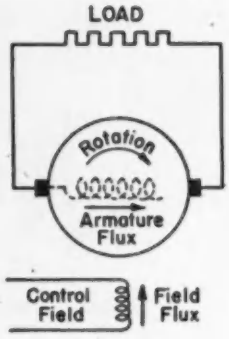


FIGURE 6
Diagram of simple direct-current generator.

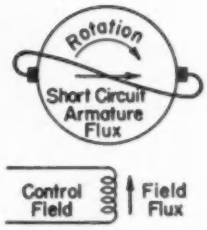


FIGURE 7
Simple direct-current generator with short-circuited brushes.

FIGURE 8
Simple direct-current generator with short-circuited brushes and second set of brushes.

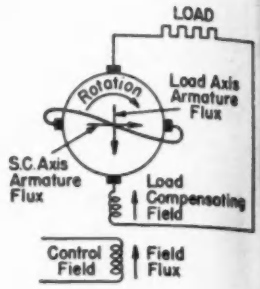


FIGURE 9
Diagram of amplidyne generator.

acceleration will be by current limit control automatically governed by the smaller electronic tubes in the upper right corner of the panel, which are the brains of the control. The power tubes are in the lower half of the panel.

For equipments 7½-horsepower and larger, electronic motor control equipment is floor mounted rather than wall mounted.

In general, panels for electronic equipment for motor control include:

Set of rectifier tubes for supplying armature voltage.

Set of rectifier tubes for supplying the field voltage.

Anode contactor which is a direct-current line switch.

Thermal overload relay.

Field-loss relay which shuts down the motor in case the motor field circuit fails in any respect.

Cathode protective time-delay relay which prevents the operator from starting the motor before the tubes have been heated for five minutes.

Set of control tubes which provide the brains for the accurate governing of the motor characteristics.

Set of anode fuses.

When the equipment is started cold, it is necessary, except for one half horsepower and smaller, to heat the tubes five minutes before the motor will start. The cathode protective relay accomplishes this automatically, the tubes being heated by the current through filaments. It is not necessary, however, to heat the tubes every time the motor is started, as they may be left heated all day if desired, and no harm will result if the motor is shut down an hour or two at a time and the tubes remain heated. As a matter of fact, it is better that they remain so than if they be allowed to cool by removing the power. As long as they are hot, they are providing a supply of electrons all ready to shoot as soon as the start button is pushed, but there is no electron emission in the tubes as long as voltage is not applied to the anode.

There are but few major machine tools to which such drives have not been applied. Lathes, shapers, drill presses, grinders, milling machines, planers, etc., are all operating by this means with better and more accurate results than ever before.

In the steel, textile and paper industries, such controls are applied, for example, to reels, to automatically maintain constant tension in winding up the material on the reel.

In the laboratory, tension and torsional testing machines are governed. In many industries operation of conveyors are so controlled. For pumps, automatic volume control is available by means of this equipment.

Carrier Current Control

This discussion was not intended to be devoted entirely to electronics, and so mention will be made of carrier current. While it is true that electronic tubes are used now in about 90 percent of the carrier current equipments, this use is only incidental as a convenience rather than as a necessity, and so carrier current control is not considered to be electronic. Past experience and present knowledge of the art of communication and control by carrier current indicate that there is no practical way of transmitting a carrier-frequency signal through a buried pipe line, using the pipe itself as the conductor. However, because there has been so much demand for this sort of thing, investigation of the possibilities will be continued, and it is conceivable that ultimately a way may be found to do this, although no one should make plans in anticipation of such a result.

Carrier-current control over electric power lines is, of course, quite successful and one interesting non-electronic application of this has been made by an oil company in Colombia to start and stop groups of oil-well pumping motors by remote control. Power is generated in the oil company's own plant and the wells are located in the jungle with a maximum length of feeder of 9 or 10 miles. When outages occur on the feeders due to such things as transient faults on the distribution system, there was much loss of time in getting men out to the wells to restart them. Control for starting and stopping the wells in groups automatically by carrier current over the power system from the power house was installed to restart the motors after such outages, and to control peak loads on the power plant by selective starting and stopping of groups of wells. This system was applied to two feeders, and by the use of two frequencies the wells can be started on each feeder in two groups instead of all simultaneously. The entire control is at the power station where the high frequency is generated by a small motor-generator set and is under control of the power-station operator. Starting and stopping the well-pumping motors is accomplished by variation in the length of carrier current impulse sent out on the feeders. The only equipment installed at each well is

■ CONTINUED ON PAGE 44

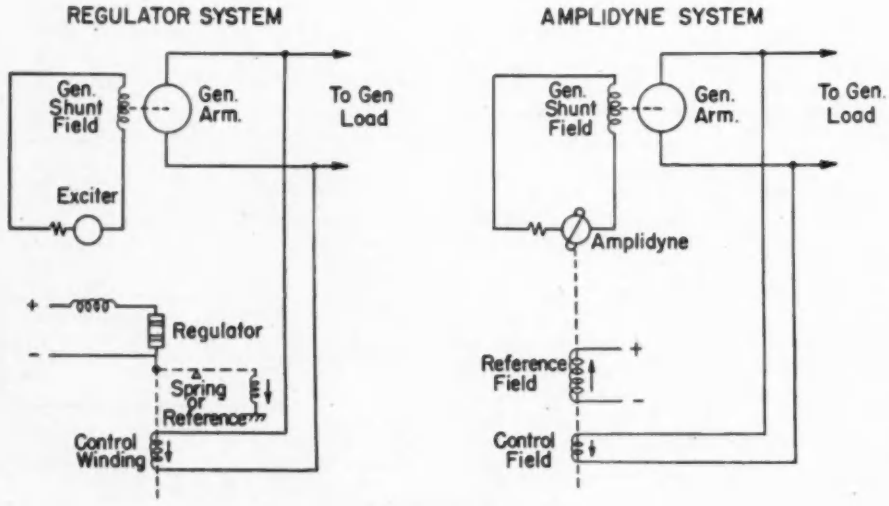
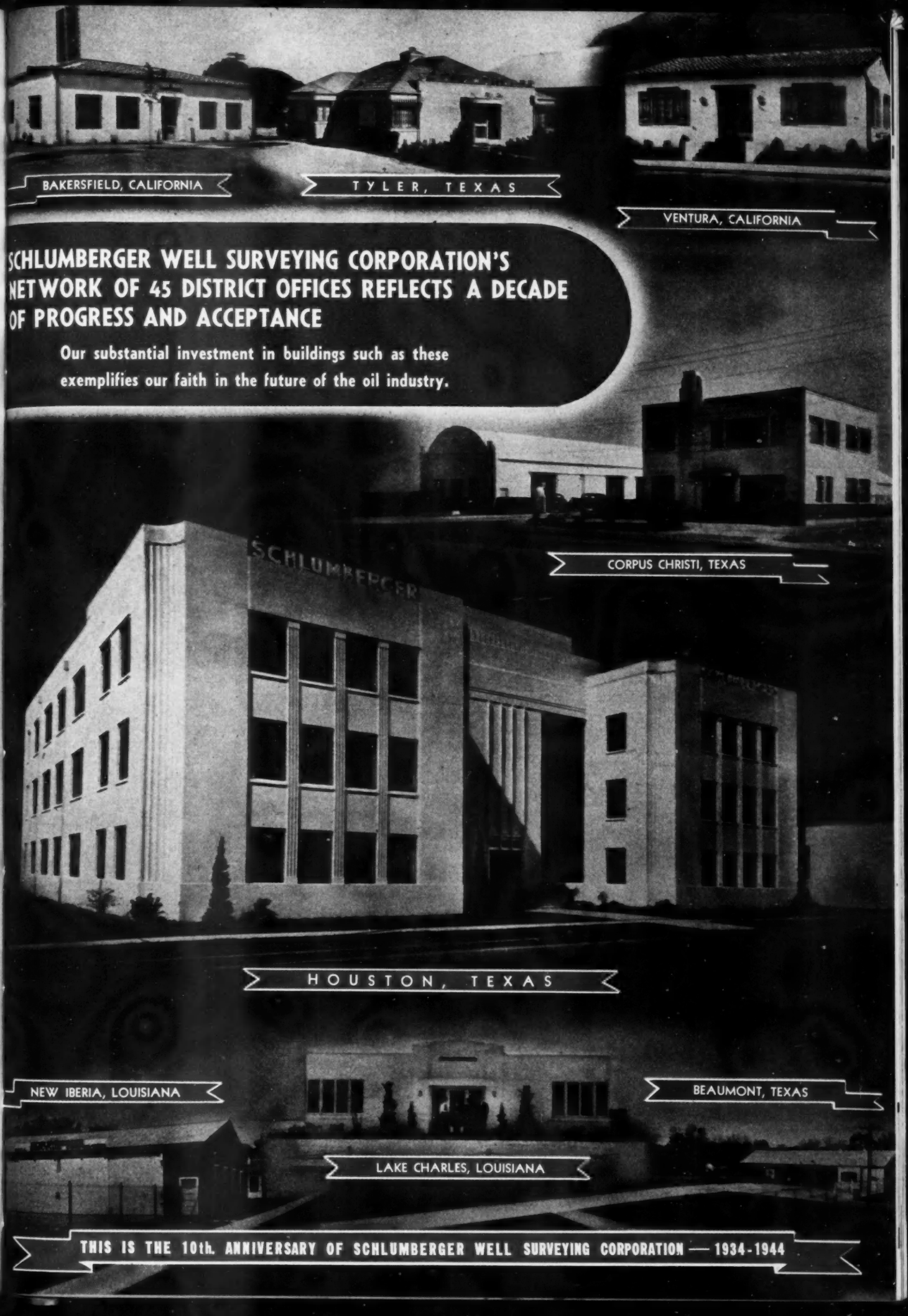


FIGURE 10
Comparison of conventional voltage regulator system with amplidyne system for controlling direct-current generator voltage.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Successful operation to a major extent is based on expert engineering practices but any operator can approximate its possibilities by applying sound principles generally in use

SECONDARY recovery methods of producing oil based on the principle of creating an artificial pressure differential between input well and producer, may be considered as being in their infancy, or a stage of perfection, dependent upon the individual's outlook and future engineering ingenuity. Great strides have been made in development and perfection of such methods during the past few years, however recovery by methods now in use probably will be limited by a summation of variable components which are at present being slowly ascertained by the industry. Percentage of saturation recovery permitted by such physical limits is, of course, in turn strongly influenced by existing economics during the period of operation.

Generally speaking the history of producing oil may possibly assume three stages, being (1) primary or flowing and pumping stage (2) artificial differential or secondary recovery as we know it, and (3) stripper, or presently unknown method whereby perfection of recovery is approached.

Secondary-recovery principles now in use offer sufficient merit to suggest installation, or at least serious consideration, by not only large but smaller companies with relative assurance of financial feasibility, provided conditions and operations meet the requirements of successful secondary recovery.

Many operators in stripper territory are not following secondary-recovery practice for a variety of reasons. Among them are hesitancy to deplete present reserves, dissatisfaction with efficiency of present methods, uncertainty of future price, financial drag imposed by taxation, insufficient manpower and shortage of materials, inadequate capital, and the belief that successful secondary recovery is to a major extent based on expert engineering analysis and control.

The latter reason is accepted as being unquestionably true. However, any operator can assign at least a rough approximate value to the secondary-recovery possibilities of his property if he applies sound, basic technical principals, now in general use by petroleum engineers.

Constant advancement of theories, research, experimentation and practical applications have yielded and permitted revealing conclusions, by numerous organizations and individuals. A considerable portion of their findings have been publicized, deserve their due praise, and should be analyzed carefully by all concerned with this phase of the industry.

Since I. L. Dunn's first attempt at increasing production by repressuring in the Macksburg field near Marietta, Ohio, in 1903, gradual improvement has been realized. However, until wartime production rates created the present shortage of crude, secondary recovery was looked upon by many as an operation to be resorted to in the future. Recently increased efforts have been exerted towards increasing efficiency of the method. The number of projects has been expanded gradually during the past 40 years, until now there are well over 1000 individual projects in operation and secondary recovery is assuming its proper position of importance.

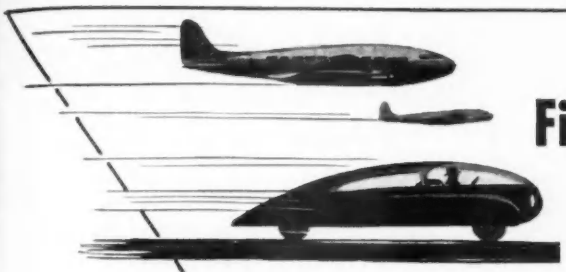
The supporting principle behind secondary recovery or pressure maintenance is one of efficiency and conservation, and is both technically and financially sound. If all decline curves were labeled "energy decline" rather than "production decline" more thought might be given the problem by the average field man. An insult to the intelligence or an example of the greediness of the industry as a whole is concretely evidenced in the nearly complete dissipation of production energy in stripper areas with approximately one third of the oil recovered.

Designers and manufacturers have exerted constant effort towards betterment of equipment for bringing oil from the well to the surface, however absolute perfection of equipment would contribute only a very small amount towards efficient drainage of a reservoir.

Full cognizance is given to the fact that gas production is fully as important as oil in many areas, and wholesale waste of gas is inexcusable and should most certainly be controlled. In effect the horse was destroyed so the buggy could be pushed out of the barn and a short time later another horse was purchased to pull the wagon out. Rather an expensive and short-sighted procedure.

Any operator contemplating secondary recovery wants to know two things before proceeding: expenditure required and revenue to be realized. Both, of course, must be estimates, based on engineering computations, precedents and experience, and their degree of accurateness is of utmost importance. Expected expenditures are more positively visualized than expected revenues due to the larger variety of variable factions affecting the latter, however engineering skill has advanced to the stage where both usually may be predicted with acceptable accurateness providing a technically and practically sound analysis is made.

To do so it is necessary that a strong knowledge of the "tools" available to the engineer be at hand. These "tools" are available to him through years of study, research, practice and compilation of data and are backed by no small degree of soundness. A petroleum engineer's technical ability is measured to a large extent by the mental dexterity with which he applies these tools and interprets their indications, and they mainly are indications since the petroleum engineer is separated from his work by the depth of the pool he is working on. Accordingly it is readily seen that such a profession may be considered as partially founded on relative and comparative data. However comparative or relative such data, or "tools" may be considered, they are being used by the foremost secondary-recovery operators. Whereas primary production may be controlled by the practical man, secondary recovery operations are definitely "up the engineers alley" and require his control. He is relied upon



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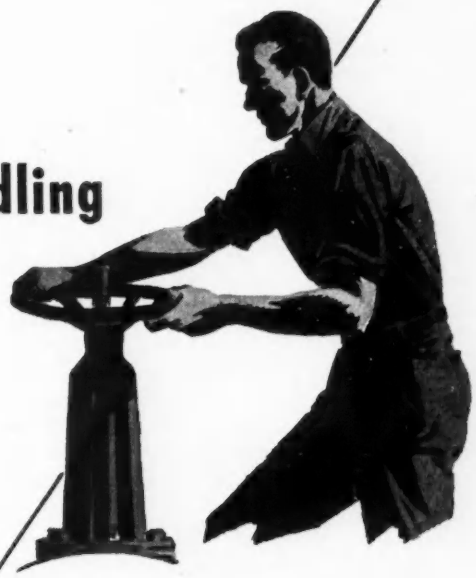

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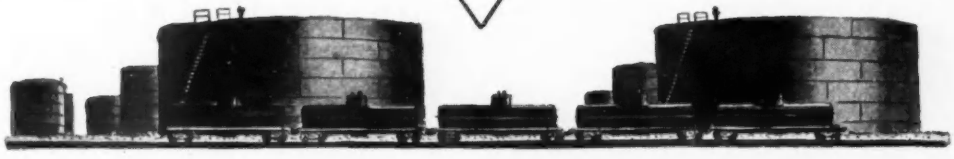

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for such supervision because he has proven his ability to operate projects successfully. By all means solicit expert engineering advice.

The first mistake many operators make is to assume there is plenty of oil in the sand and all they have to do is inject air, gas, or water into one of their wells, sit back and wait for production approximating the initial from the others. Their day of reckoning will soon be forthcoming. Then too, innumerable operators have condemned their properties because "some fellow they know injected gas in a well in a pool close by and it didn't work." Any operator controlled by such distorted reasoning should feel privileged to own and be morally responsible for producing a portion of the nation's resources, when such reasoning can be corrected by a small smattering of facts.

The principle of repressuring may be illustrated by blowing on the end of a small tube filled with oil. By so doing the pressure at one end of the tube is higher than at the other—or a *pressure differential exists.* The oil in the tube originally is the amount of oil present in the sand—or the saturation. The amount blown out of the tube is the recovery from repressuring and that left sticking to the inside of the tube represents the oil left in the sand after repressuring. The person blowing on the tube may be considered as the surface plant.

If the person should pump water through the tube instead of blowing through it he would be employing the principle of *water flooding.* He still creates a *pressure differential* by putting water in one end of the tube under pressure, and accordingly forces out oil, but in addition increases the amount of oil forced out of the tube since the water tends to wash the oil off the inside of the tube. Thus are illustrated the basically simple principles of flushing oil from a reservoir by repressuring, with air or gas, and water flooding.

The probable effect either of these actions will have on any reservoir should be determined before starting operations. Preliminary investigation should determine the amount of oil recoverable, method to be used (repressuring or flooding), design of surface equipment, subsurface completions, general operational features and estimated financial balance during expected life of project. The investigation should be conducted with meticulous care and if possible intrusted to a competent engineer. He may not always be successful but will recover more economical oil than you, if you are a novice at the business.

Even though definitely accepted as an economical proposition, preliminary investigation, design and diligent operational control, contribute greatly towards dictation of economic status of any secondary-recovery project.

Electronics in the Oil Industry—

■ CONTINUED FROM PAGE 40

one relay in a tuned circuit at each motor control, for both starting and stopping the motor.

Four hundred wells are being handled by this method of emergency control and very satisfactory service has been obtained in the four years that this equipment has been in service.

Although it will be appreciated that the conditions warranting this installation are somewhat special and would not necessarily be found on many leases, especially in the Southwest, the knowledge of what has been done may be useful in considering some future problem of this kind.

Amplidynes

It was mentioned early that there is another comparatively new electrical tool, to accomplish results in industrial applications which are either better than before or could not previously be accomplished. This tool is the amplidyne. It is a small direct-current generator, outwardly similar to a conventional machine.

The amplidyne acts as a special exciter and functions as a control device to perform a wide variety of functions, such as to control speed accurately, to limit electrical loads, to control torque and tension and thus improve product uniformity in winding, drawing and other similar operations, to regulate current, voltage, power, or speed, to accomplish precision positioning, or to speed up acceleration and retardation of high inertia machines.

The principle of the amplidyne is explained in a step-by-step presentation in the next series of illustrations. The diagram in Figure 6 shows a simple direct-current generator, in which the load current produces a magnetic flux in the armature as if it were a coil stationary in space. Figure 7 shows the brushes short-circuited. Under this condition it requires only a small field excitation to circulate full load armature current, and this current produces full armature flux, the same as in Figure 6. Keep in mind that the field excitation is now extremely small. In Figure 8 a second set of brushes has been added, and the armature flux produced by the short-circuit current results in full voltage across this second pair of brushes. In Figure 9 is shown the amplidyne. A series compensating field has been added to offset the magnetic flux produced by the load current, which would otherwise oppose the flux produced by the control field. The control-field current still remains extremely small, which is the important feature of this machine. Full voltage and current output are obtained from the brushes on the load axis. The action is that of a two-stage amplifier with an amplification as high as 10,000 to 1 obtainable readily. Because the control field has a very small inductance and requires little power, it is possible to obtain extremely rapid response to changes in the control-field circuit. The control-field coil takes so little space that there is plenty of room for three more control fields which will thus permit many independent functions to control the amplidyne output. For example, one of these fields may be made responsive to the variation in load current in the machine which the amplidyne controls, and may be so connected as to limit that load current to a pre-determined value. Voltage and speed of machines may be similarly controlled accurately and automatically.

The use of multiple fields in the amplidyne greatly reduces the number and size of control devices required to obtain a certain performance. Because the field currents are so small they are easily adjusted by means of small control devices and can readily be adjusted to meet operating conditions.

Used as Voltage Regulator

One application of the amplidyne, that as a voltage regulator, is shown in Figure 10. At the left is a conventional voltage regulator system; at the right is the amplidyne performing the same function with quicker response. The reference field is excited from a constant voltage source, and the control field, responsive to generator voltage, bucks the reference field to vary the output of the amplidyne to the generator field and thus maintain constant generator voltage.

One example of how the amplidyne may be applied is of interest to the oil industry. With generator-voltage control for direct-current motors, commonly known as Ward-Leonard control, the speed of a direct-current motor receiving power from a generator is varied by varying the voltage of the generator. This is a system which is used on electric drive for large mine hoists, for electric shovels, and for large rotary-drilling rigs. To obtain control of the motor speed, a controller and resistor are normally required to change the strength of the generator field. On a rotary-drilling rig from two to four such controllers may be needed, and they must be located near the driller so that he can operate them from his position on the derrick floor.

The amplidyne can be substituted for the controller and resistor and it can be located as far away from the well as it may be desirable, as the driller will operate it electrically, not mechanically, by means of a relatively small rheostat at the draw works post. Such an arrangement will save floor space and simplify the control circuits required, and will result in performance of the drilling rig superior to that obtainable by other means.

This discussion has necessarily been limited to touching upon only a few of the ways in which these control devices and control circuits are used. It is hoped that two things have been made evident: first, that the principles involved in both electronic and amplidyne control are simple and easy to understand and that no one need be over-awed by these names applied to them; and, second, that by means of these types of control both new results, and better ones than ever before, are being obtained.

It should not be inferred that either electronics or the amplidyne is going to replace all established means of control. They are, as has been said before, merely new tools to add to the many others which the designer and application engineer have at their command, and they will be recommended only when good judgment dictates.

NOTE TO SERVICE MEN AND WOMEN . . . . .

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Co-op Movement Hits Petroleum Industry

Tax-favored associations have become big operators, supplying one fifth of oils used on American farms. More expansion likely as cooperatives have enjoyed success in drilling, producing, and refining operations

WITH formation of the National Cooperative Refinery Association in July of 1943 by five large regional cooperative associations for the purpose of purchasing the Globe Oil Refinery, located at McPherson, Kansas, and announcement of the proposed organization of an International Cooperative Trading and Manufacturing Association to engage in all phases of petroleum, cooperators served notice on the petroleum industry that by utilizing war-swollen, tax-free profits and the many special privileges accorded them by government, they seek to monopolize international business and to ultimately replace the present profit system.

The plan for world cooperative dominance has been well described in the fifteenth annual report of Consumers Cooperative Association, of North Kansas City, Missouri, which reads as follows:

> "The consumer cooperative movement in the United States is beginning to emerge as a national movement . . . regional cooperative wholesales have joined hands on a national basis in petroleum . . . there will be examples of such teamwork in other fields . . . then to unite with cooperatives internationally in production and distribution will be a next and relatively easy step . . . it is a step that must be taken if the common people we represent are to provide checks and balances against the grand-scale monopolies at home and the super cartels abroad."

There can be no doubt that great progress has been made in bringing the plan to actual accomplishment. The framework has been completed. Expansion of present cooperative activities will bring it to a conclusion.

Cooperative Activities Numerous

Today, 2327 local cooperative associations supply more than 20 percent of petroleum fuels used on American farms and are making substantial inroads on the urban market. They serve more than 600,000 members and do an annual business in excess of $197,000,000. Regional co-ops own and operate 11 refineries, and are planning the purchase of additional refining facilities. They are also conducting exploratory operations and are engaged in crude production. One regional cooperative wholesale alone owns 289 oil wells and 867 miles of pipe line. Their facilities are further implemented by the ownership and operation of river terminals, barge lines, and oil compounding and blending plants.

A PRELIMINARY report on the expansion of the cooperatives in the petroleum industry has been issued by the Research Department of the National Tax Equality Association.

Telling of the creation and operation of super-cooperatives in this industry, their financing, their purchases of refineries, pipe lines, and producing fields, and the growing volume of their business, the report concludes that the great expansion of these businesses has resulted from their exemption from Federal income and excess profits taxation and other privileges granted by Government.

"With some semblance of competitive equality," says the report, "the petroleum industry could offer little objection to the competition of cooperatives and should be able to compete successfully. It cannot, however, pay its share of the high cost of war and at the same time, through taxation and many other competitive disadvantages, support its opposition."

The accompanying condensation of the preliminary report has been released by the National Tax Equality Association with the request to the oil industry that the facts and figures be examined closely, and that any comments, criticisms and additions to the factual data be supplied by all branches of the industry before the final report goes to press.

Reasons for Success

Petroleum and other cooperatives have prospered as a result of the many special privileges and favors granted by government. These have given them many unfair competitive advantages over private business. They enjoy cheap and favorable government credit. Their growth has been promoted by government. They have been exempt from business regulatory laws. They pay very little or no federal income and excess profits taxes.

In order to maintain their freedom from federal income and excess profits taxes, cooperatives must distribute their profits to the patrons on a basis of their purchases, and are not allowed to accumulate unreasonable reserves. They have, however, devised many means for circumventing the law in this respect, and have been able to retain their profits, in many instances, for use of the association.

Because dollars saved through tax exemption represent much of the investment in new facilities of cooperative enterprise, it is reasonable to conclude that cooperative ownership is indirectly paid for by all taxpayers, and that the individual cooperative members who profit thereby are being unduly enriched at the public's expense. An illustration of this effect is provided by the record of 14 major cooperatives, which had combined earnings of $10,383,177 during their fiscal years ending in 1942. They would have paid approximately $6,582,943 in federal income and excess profits taxes if they had been taxed at the average rate paid by private industry (63.4 percent.) Instead this and additional funds, amounting to $7,285,073, were retained in the capital structure and, therefore, were available for expansion. The rest of the non-taxed net earnings, $3,098,104, were returned to the patrons in the form of cash dividends and stock.

Future Objectives

As previously pointed out, the leaders of the cooperative movement have indicated that their consumer market will ultimately embrace the entire world in the field of petroleum distribution. At the present time they are actively engaged in extending their distribution into urban areas. To supply this ever increasing market of petroleum products will require additional production and refining facilities. There can be little hope that petroleum cooperatives will discontinue their absorption of oil fields, refineries and pipe lines until they have sufficient capacity to service the entire demands of their consumer market. This fact was well established when the five major petroleum wholesales pooled their interests to purchase the Globe Refinery. At that time the leaders of the movement declared, "Cooperative wholesales, being service organizations, are seeking, through the purchase of additional refining facilities, to meet the refined fuel needs of their members 100 percent."

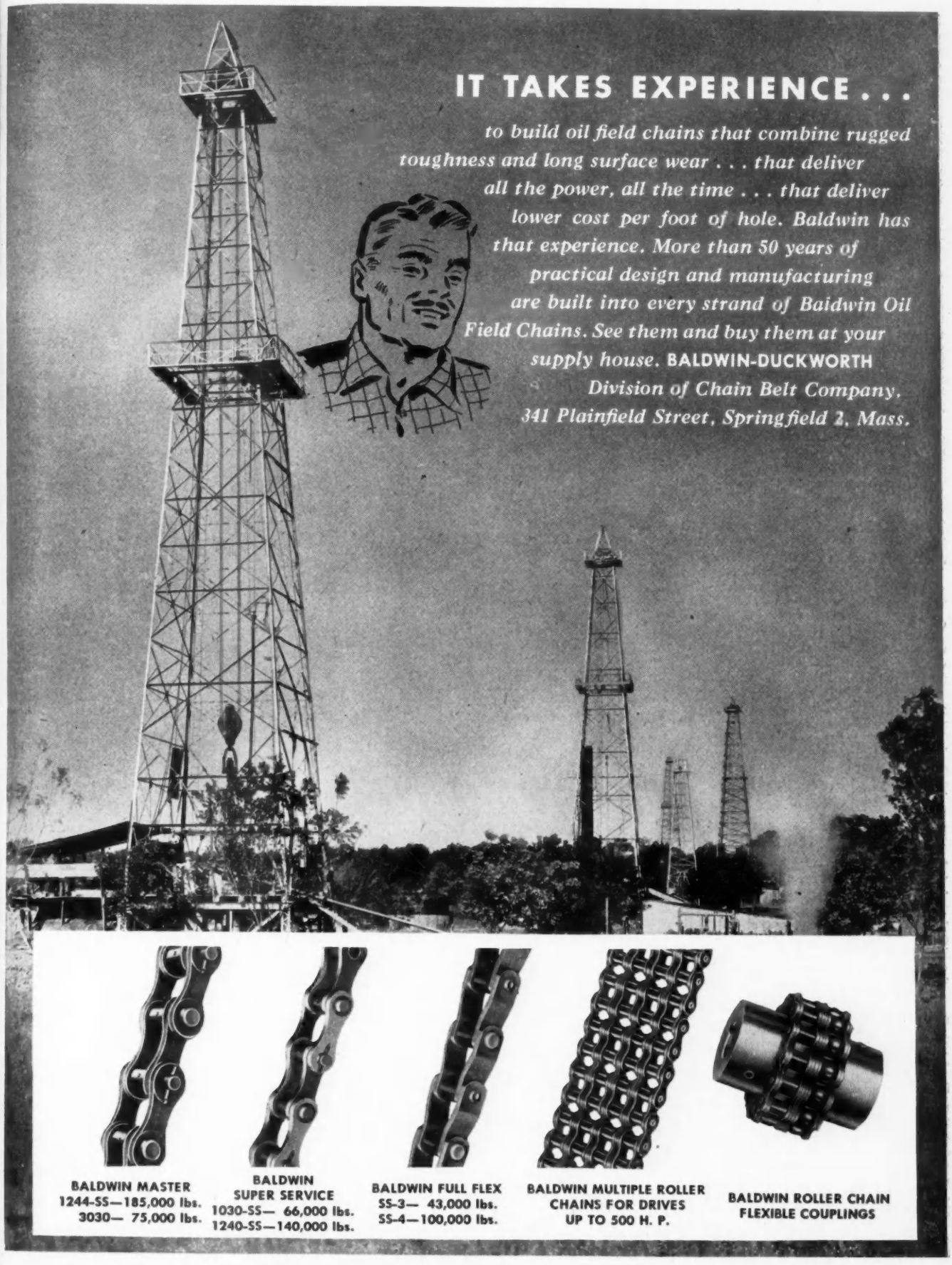
Formation of World Oil Cartel

On January 17, 1944, directors of the Cooperative League meeting in Washington, D. C., voted unanimously to organize the International Cooperative Trading and Manufacturing Association—"to engage in all phases of the petroleum industry and in food distribution." The plan was presented by Howard A. Cowden, vice president of the League and chairman of its committee on international cooperative reconstruction.

The plan was later presented to representatives from 22 countries, attending a conference on cooperative rehabilitation. It was approved by this group in principle and later will be presented to cooperative organizations all over the world for ratification.

This would not be an entirely new undertaking, since the Consumers Cooperative Association, headed by Cowden, shipped significant quantities of grease and oil to cooperatives in Canada, Scotland, Sweden, Holland, France, Esthonia, Finland and Bulgaria prior to the war. In exchange, they received large shipments of tea.

Capital requirements of this huge undertaking were estimated at $12,160,000 as a maxmium figure to begin petroleum distribution on an interna-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tional scale. It was suggested that 80 percent of the cost be borne by overseas cooperatives and 20 percent by cooperatives in the United States. It has been indicated that a portion of the money might be obtained from PRC.

The large regional wholesale petroleum cooperatives pooled their interests to form a "super petroleum cooperative" to purchase the Globe Refinery at McPherson, Kansas. The purchase of this refinery was of particular significance to the petroleum industry, since it represented the first national federation of cooperatives to enter the fields of petroleum production and refinery operation. The National Cooperative Refinery Association was created by Central Cooperative Wholesale, Superior, Wisconsin; Midland Cooperative Wholesale, Minneapolis, Minnesota; Farmers Union Central Exchange, St. Paul, Minnesota; Farmers Union State Exchange, Omaha, Nebraska; and Consumers Cooperative Association, North Kansas City, Missouri.

The Globe Refinery was built in 1932 as a 7500-barrel plant. It had been enlarged from time to time and, when purchased by the regional cooperatives, had an extreme capacity of 17,500 barrels of crude per day. The purchase included a 6-inch, 229 mile pipe line from McPherson to Council Bluffs, Iowa, together with land, buildings, storage tanks, and equipment.

The association was incorporated with an authorized capital of $2,010,000, or approximately 40 percent of the cost of $5,000,000. The five wholesale associations participating in the purchase subscribed to stock of NCRA in the amount of $1,550,000. It is probable that the remainder of funds for the refinery purchase was financed by a loan granted by the Wichita Bank for the Cooperatives. These loans bear interest at the rate of 3½ percent, are secured by first mortgage on the property, and may be made in an amount up to 60 percent of the appraised value of the facilities acquired.

Engaged in Refining and Producing

The super petroleum cooperative, of course, was preceded by many large regional cooperative wholesales. These wholesale associations were originally organized by the local cooperative associations to capture the economies resulting from large-scale purchases. At first they were little more than brokerage agencies, but they were so successful that they soon extended their operations back to the sources of supply, namely, production and refining.

The first association was incorporated in Minnesota in 1926 as the Minnesota Cooperative Oil Company, later changed to the Midland Cooperative Wholesale. It was the first cooperative wholesale association in the United States organized primarily to engage in the distribution of petroleum products. Its organization was followed by similar organizations throughout the country. In addition, many existing cooperative wholesale associations began to distribute petroleum products and soon thereafter these products represented a major line.

The importance of such wholesale associations is reflected in the dollar volume of sales figure compiled by the Farm Credit Administration for 17 major wholesale cooperatives. The combined value of supplies sold at wholesale amounted to $220,360,873 for the year ending in 1942. Petroleum products represented $47,966,314 of this volume. It is further estimated that all cooperative wholesales handled petroleum products in 1942 amounting to 655,000,000 gallons of refined petroleum fuels, 10,792,000 of lubricating oil, and 12,929,000 pounds of grease.

As early as 1934, three wholesale associations operated their own oil compounding plants and laboratories. At the close of 1943, nine cooperative wholesales owned 10 refineries with an estimated daily capacity of more than 46,000 barrels, hundreds of miles of pipe line, seven oil compounding plants, grease plants, and oil producing wells.

The real pioneer in cooperative petroleum production and refining was the Consumers Cooperative Association, of North Kansas City, Missouri. It organized a subsidiary, the Cooperative Refinery Association, to construct the first cooperatively owned refinery in the United States at Phillipsburg, Kansas, in the year 1939. Operation of the 3000-barrel refinery began in 1940. The refinery paid for itself in two years.

Two additional subsidiaries, the Cooperative Oil Producing Association and the Cooperative Pipe Line Association, were organized to engage in oil exploration and production and to transport the oil to the refinery. These subsidies now own three refineries, 867 miles of pipe line and 289 oil wells.

CCA purchased the Terry Carpenter 1500-barrel refinery at Scottsbluff, Nebraska, in 1942, at a cost of $750,000, and National Refining Company's 13,500-barrel plant at Coffeyville, Kansas, in 1943, at a cost of $4,000,000. It also sponsored formation of National Cooperative Refinery Association and, through it, owns a part interest in the former Globe Refinery.

Rapid Growth

The association began operations in 1929 with seven members and $3000 capital. At the end of 1943, its membership had increased to 749 and its net worth to more than $2,800,000. Total sales amounted to $309,000 in 1929 and more than $15,000,000 in 1943. The majority of its present net worth represents profits retained in the capital structure.

At the end of 1942, cooperatives owned four refineries. In addition to the two refineries owned by Consumers Cooperative Association, the Indiana Farm Bureau Cooperative Association and the Farmers Union Central Exchange of St. Paul had purchased a 3000-barrel plant and a 500-barrel plant, respectively. The former located at Mount Vernon, Indiana, and the latter at Laurel, Montana.

In addition to purchase of the Globe Refinery by the National Cooperative Refinery Association about the middle of 1943, the following refinery purchases were made during 1943: A refinery with a 4500-barrel capacity was purchased by Midland Cooperative Wholesale. Farmers Union Central Exchange also entered the field of refining by the purchase of a million-dollar plant with capacity of 96,600 gallons of gasoline per day. In addition, it produced codimer, a component used in aviation gasoline and synthetic rubber. Missouri Farmers Union bought a petroleum refinery, 115 miles of pipe line, land and storage facilities for $321,000. Consumers Refinery Association purchased a 10 million-gallon oil refinery and an 81 million-gallon petroleum refinery, 270 oil wells, 768 miles of pipe line, and leases on 104,408 acres of oil land. These additions to its petroleum facilities placed it close to the top as an independent refinery.

Cooperators, beyond question, believed that production offers the most profitable field of operations, and they fully intend to capitalize on the competitive advantage that they have over their tax-burdened opposition. Their spectacular entry into production and refinery operations in 1943 far overshadowed other cooperative developments of the year.

Furthermore, cooperators contend that they have merely scratched the surface and have not yet begun to obtain maximum economies resulting from these operations because their acquisition of refineries, pipe lines, and oil fields have been too recent a development. They contend and confidently expect "that in a matter of maybe 15 or 20 years *they will become the biggest single factor in the oil business* . . . they point to savings of 1 cent a gallon in gasoline retailing, another ¼ cent in wholesaling, and 2½ cents in producing and refining operations."

Local Petroleum Associations

The first petroleum purchasing or distributing cooperative association made its appearance in Cottonwood, Minnesota, in July of 1921. Since that date, the gas and oil cooperatives have expanded until — "Approximately 20 percent of all petroleum fuels used on American farms during 1942 were purchased through farmers' cooperatives."

Total retail distribution of gasoline and other petroleum fuels by cooperative associations for the year 1942 has been estimated at about 728 million gallons, of which approximately 655 million gallons represent consumption by farmers. Lubricating oil distribution was estimated at 12,191,000 gallons and grease at 14,365,000 pounds for the same period. Only about 10 percent of petroleum products distributed at retail by cooperatives is obtained through private channels. The remainder is purchased from regional wholesales.

Bureau of Labor Statistics of United States Department of Labor estimates that there were 1150 associations primarily engaged in the distribution of petroleum products in 1936, with 325,000 members and a business of $69,985,000, and in 1942 an estimated 1400 comparable petroleum associations, with 650,000 members and an annual business of $197,000,000.

Experience has shown that cooperatives are influenced by the same economic factors as private enterprise, but that they have prospered disproportionately as a result of the artificial stimulants applied by a benevolent government. Exemption from income and excess profits taxes and business regulatory laws, together with governmental credit and special privileges, have enabled the petroleum cooperatives to absorb many independent distributors and refiners.

With some semblance of competitive equality, the petroleum industry could offer little objection to the competition of cooperatives and should be able to compete successfully. It cannot, however, pay its share of the high cost of war and at the same time, through taxation and many other competitive disadvantages, support its opposition.

High Priority Ratings Asked for Workers

District 3 production group acts in connection with referral program which became effective on July 1. Manpower assistance needed if drilling program met

By A. R. McTee, Staff Writer

ACTING to forestall possible bad effects on the manpower situation in District 3 from introduction on July 1 of the priority referral program by War Manpower Commission, the manpower subcommittee has asked the commission to give oil-field workers in several categories a high priority rating. The problem was reviewed in Houston, last week, at a meeting of the subcommittee attended by representatives from the War Manpower Commission from Dallas and Houston. The new order was discussed and explained and its likely impact on oil field manpower, anticipated. It was the general opinion that the program should be of assistance in resolving the manpower problem rather than in further complicating it inasmuch as the whole idea back of priority referrals is to place and keep men in essential industries. In areas where critical industries predominate, there may be further acuteness in manpower shortage for oil field operations. Fortunately however, such districts are not widely distributed in proportion to areas of oil activity.

High Ratings Needed

The resolution requesting a high priority rating was addressed to R. V. Shirk, chief of the manpower section of PAW, and embodied a statement of the pertinent factors affecting manpower within the industry. It was recalled that the drilling branch of the industry has expanded operations approximately 100 percent during the past 12 months, thus drastically overburdening the already relatively small number of trained men in this branch of the industry. Due to present living conditions, the frequent moves necessitated in oil field work, and the undesirable climate in many instances, it has become progressively harder to recruit manpower for drilling.

Also, the drilling of exploratory wells is now approximately 24 percent short of PAW's requested number for 1944. In spite of diligent recruiting efforts by the manpower subcommittee in District 3, the drilling branch of the industry is far from being fully manned. Already, crude oil withdrawal in many districts is beyond safe maximum limits, and due to pressure declines, more attention must be given to secondary recovery methods that require artificial lift, water flooding, etc., which in turn call for increased maintenance personnel.

Briefly, the priority referral program is a system of job priorities which has already operated successfully in 14 critical labor shortage areas. The extended program, designed to equalize dangerous maldistribution of labor supply, provides for the channeling through United States Employment Service, (or other approved facilities) of all male workers not otherwise instructed in every area to essential jobs offered in the order of their relative urgency to the war effort. Under the system no employer, other than agricultural, may hire any male worker in any area except from among those referred to him by the United States Employment Service or under arrangement with the Employment Service. Manpower priorities committees evaluate employer's minimum manpower requirements, set up a system of job priorities according to occupational importance, establish employment ceilings and manpower allowances, and assign manpower priority ratings or categories of priorities to employers in the area. These functionaries will operate in Group 1 and 2 Districts only, for the time being. Within the limits of the system and in direct proportion to the amount of labor demand in a given period, it is the plan to give the greatest possible freedom of choice to both employer and workers. It is the purpose of the program to attempt to show where the workman can be of the greatest help, rather than force him to a job in which he might have no interest.

Certain Localities Exempt

In areas where no priority committees are formed, a national priority list from the WMC will be used by the United States Employment Service.

Also in localities where there are no United States Employment Service offices, or where facilities for carrying on the referral program are lacking, no attempt will be made to force its observation. For example, an operator drilling a wildcat well in an isolated region where none of these agencies exist, will not be bound by the program. He may employ men who have certificates of availability from either United States Employment Service or their former employers, without having to clear through any priority committee or WMC agency. The Commission is now working up a list of counties where employment will be handled in this manner, and the lists will be made available as soon as they are completed.

High priority ratings have been requested for employes in the exploration, drilling, production and oil field servicing phases of the oil industry.

In exploratory work, technicians including geologists, geophysicists, paleontologists, engineers, core drillers, as well as various assistants and helpers, are required. PAW requested 6000 exploratory wells for 1944. According to Ray H. Horton's summary of conditions in District 3, made before the labor counselor for PAW, recently, "The number of geophysical crews now stands at an all-time high.—Many of the employes are men of some college training who have learned the requirements of their jobs through several years of practical experience. Much of the knowledge of the activities of these crews cannot be gained through academic training as new methods and procedures are constantly being adopted. For this reason it is extremely difficult to get replacements in this branch of production operations." Horton, who is chairman of the production manpower subcommittee for PAW's District 3, also points out that "roughly 6000 employes comprise the entire field of geophysical work in the United States," and stresses the necessity of retaining all trained men engaged in exploration activities if this type of work is to increase to the proportions asked by PAW.

Short of PAW Figure

The survey cites figures to stress the inefficiency of many drilling crews as a result of inexperienced men. "The inefficiency of present crews," according to the report, "is evidenced by the fact that despite the total increase of drilling rigs in operation, the number of wells actually drilled to completion was one sixth less during the first quarter of 1944 than in the first quarter of 1941. More rigs must be put in operation if the industry expects to drill the 24,000 wells in 1944 requested by PAW." Most operators are now working three crews per rig, each crew working an eight-hour shift seven days per week.

Increasing demand for crude oil already has brought requests from PAW for more attention to secondary recovery methods. Operators are encouraged to stimulate all technical studies and suggestions that might lead to greater output of oil from present reservoirs. Thus an added burden is placed on the already overtaxed small group of technical experts in the production branch of the industry.

Oil field servicing which includes surveying, electric logging, casing perforating, shooting, cementing, directional drilling, bit servicing, tool setting, treating, welding, testing, workover and plug-back work, etc., is severely handicapped by shortage of help. Highly trained skilled men perform these services for the most part. So important have such services become in routine field operations that production is often held up or delayed by failure to obtain any of them. As is shown in Horton's survey, many servicing companies control their own vital tools or equipment, operate such equipment themselves, and shortage of help practically eliminates the service. Often the successful completion of a well depends on some such special servic which if not available can cause the well to be ruined or its ultimate production greatly reduced.

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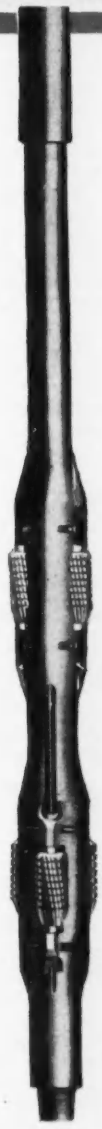

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Invasion Calls for More Oil

• CONTINUED FROM PAGE 15

their own petroleum supplies, this new front becomes only the second land battle zone in Europe to depend largely upon the United States as its source of oil. In addition to employing the air arm as fully as other war theatres, this new front no doubt will use mechanized land forces on a scale heretofore undreamed of. Forthcoming battles in this new phase will be characterized by mechanized units in numbers that will greatly overshadow the Italian front, where mountainous terrain and comparatively small territory have limited their use. The above factors, plus the fact that fighting on the islands of the Pacific and on the China-Burma front have employed mechanized units on only a very small scale, indicate this new front could easily double the quantity of United States petroleum consumed by land forces even when aviation and naval, or overall, consumption is considered, a 50 percent increase in gasoline requirements may result from the European invasion.

Meanwhile, military officers have asserted that recent spectacular successes in the Pacific have put that campaign months ahead of schedule. This can only mean more intensive fighting. While the Pacific for the time being, at least, will remain largely a naval and air battle, these divisions also are heavy consumers of oil. Prospects of greater activity in the Pacific occurring simultaneously with the Western Europe campaign, will add to gains in prospect for oil consumption rates.

Action Indicates Acuteness

The acute military petroleum supply situation is indicated by action taken in the past two weeks.

Faced with prospects of exceptionally sharp increases in consumption of motor-type gasoline by the armed forces, which use 91-octane for tanks and trucks, PAW during the third invasion week ordered a 40 percent cut in quantity of premium grade gasoline available for civilian use. Recent enlarged takings of this type of gasoline has boosted tetraethyl lead requirements to a point where it not only exceeds current production but now endangers the reserve supply needed to meet military demands.

While the largest immediate gain in military consumption will be in motor-type gasoline, aviation gasoline supplies also were in such critical condition that action was taken during the past week to increase the quantity available for use on combat fronts. Asserting that commanding generals in all active theatres were demanding increased shipments of aviation gasoline, and that it might be necessary to ship up to 50 percent more fuel during the next few months to some fronts, Assistant Deputy Administrator Bruce K. Brown asked refiners to go all-out in making aviation gasoline. "Please push as hard as you possibly can," he said.

The seriousness of the aviation gasoline shortage was further indicated when the government ordered a cut back in the production of synthetic rubber (see *Washington Roundup* this issue) so butylene could be diverted from the rubber program to the aviation gasoline program. The order was expected to reduce rubber production by 30,000 tons but provide an additional 1 million barrels of gasoline.

Unusually heavy drafts on above-ground stocks of crude oil during the first three weeks of the Western Europe invasion have called attention to the extremely low level of crude oil storage. The recent large withdrawal rates have reduced crude oil stocks to a level that is 13 millian barrels less than a year ago, and approximately to the same volume as when six Mid-Continent states shut-down their wells during 1939, or almost at the lowest quantity since 1922. However, these figures do not represent a true comparison of the industry's actual usable volume of crude stocks, for included in the volume is the amount of oil contained in pipe lines, which is much greater today than in the past.

Since oil cannot be taken out at the terminus of pipe lines without injecting other oil into the system at some point along its route, much of the so-called stored oil actually is not available for use, but must be maintained as working stocks. Since beginning of the war, more than 10,000 miles of additional pipe lines have been constructed, and millions of barrels were required to fill them. The famed 1388-mile 24-inch Big-Inch line, for example, alone took roughly 4 million barrels to fill. Thus, the actual usable stocks of crude actually are much smaller than storage figures indicate and are materially less than in previous years, for larger quantities are required to keep expanded pipe line systems filled so they may operate.

With stocks of petroleum critically low, consumption requirements must be filled from oil produced currently. If record production rates have not been sufficient to meet requirements during the first three weeks of the invasion, what will be the situation when fighting on the new land front reaches gigantic, intensive scale? How is it to be supplied by the industry?

Must Maintain Storage

Of course, it may be argued that much of the oil supplies needed for the new front already have been moved to England. However, military strategy no doubt will require as a protective measure that storage facilities in England continue to be maintained at full capacity. And, whereas the supply now in England could be accumulated rather gradually during the months of preparation, and during a time when land forces were not in combat, the maintenance of that supply must henceforth be at a rate equal to the increased present consumption. Furthermore, large depots of petroleum products must be established in France, and the more territory reconquered, the greater the number and size of supply dumps that must be established to satisfy transport and combat vehicle needs.

With the need for greater production of crude oil reflected in the industry's recent statistical trends, the industry has been asked by PAW to boost its output in July by 28,500 barrels above record June levels. Contrary to what might be expected, all the increase in July will be sent to the West Coast, indicating the rising tempo of fighting in that area. Further gains in production are indicated for August, when Stanolind is expected to have additional pump stations in operation on its West Texas to Oklahoma line. This will call for an additional 20,000 barrels daily over July.

Prospective additional gains in production during July and August will boost the nation's producing rate to the level of its estimated maximum efficient producing ability. This means that no longer will there be a single barrel of what heretofore has been called "surplus producing ability." How then can it continue to meet ever rising consumptive demands? Until hostilities cease in Europe this will become a more and more pressing question.

One possibility would be to discontinue the practice of establishing producing rates on a field basis, and place it on an individual well basis, especially in fields having some wells capable of producing larger quantities—in other words, replace the practice of calculating the maximum efficient producing rate on a field basis and do it on an individual well basis. Many fields are not now producing at their estimated maximum efficient rate because some wells fail to produce their quota or allowable. The nation's production rate could be increased materially if the better wells in a field were permitted to make up the shortages caused by poor wells. The idea has been practiced in California and is largely responsible for the surprising ability of the West Coast state to continue to maintain production at levels generally thought impossible.

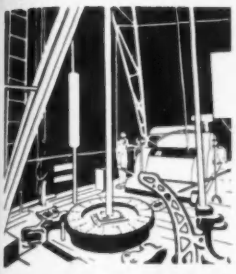
But even if this is done, the real responsibility of seeing that enough oil is produced will fall upon the shoulders of the oil man. He must, for patriotic reasons, go all out in an effort to see that every possible barrel is produced, refined and transported.

Whenever a well goes off production, for example, he must hasten to get it back in operation. A 100-barrel well off production for 10 days means the loss of 1000 barrels, and 100 such instances would mean the loss of 100,000 barrels. Individually, losses of 10, 50 or 100 barrels might not seem important, but when there are numerous such instances among the 400,000 producing wells in the United States the loss can easily attain important proportions. Operation of a well at a lower producing level than necessary, even if reconditioning is necessary, would be just as disloyal.

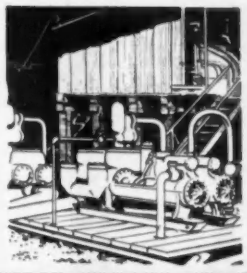
In some instances, especially among smaller companies and individual operators, this might have financial disadvantages, such as jumping the owner into a higher income-tax bracket. In other cases, operators may not feel justified in spending money to recondition wells. But the nation is at war, and everyone who can make important contributions like additional oil should do so.

Operators of pipe lines and refineries also have the responsibility of seeing that their systems and plants are operating constantly and at maximum efficiency rates. They also will have to contribute, in the form either of taking or giving up crude, which in some cases will mean the loss of revenue.

Everything must now be considered from the standpoint of national welfare, and the industry should be prepared to make whatever sacrifices become necessary.



OPERATING HINTS *For Drilling Crews*



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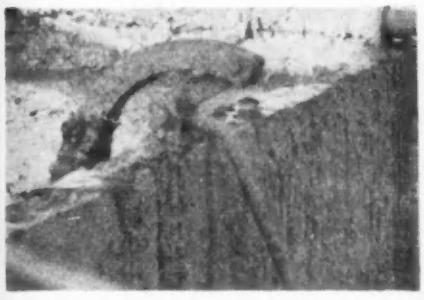
Quick Closing Flume Halts Mud Contamination

Where above-ground mud pits are used, as in rocky soil or over porous formations where mud loss through infiltration would be serious, either steel tanks or inexpensive (unreinforced) concrete tanks are advantageous and offer time- and labor-saving possibilities in handling the fluid.

MUD BATCH CHANGING

One such series of tanks is provided with quick-opening flume gates which enable a quick change in mud flow to be made with little effort. The gates, operating within slides or guides built into the pit wall, need not be absolutely watertight in their fit, as the mud cake quickly seals any small crack and prevents wastage.

The flume gates, operated through a quadrant atop the tank wall and lever with arc of actuation outside the mud, may be locked by proportioning the lever and quadrant so that the weight of the handle and quadrant rest atop the gate in the closed position, while the portion of the quadrant beyond or outside the pivoting point is added to the weight of the lever in preventing accidental closing of the gate in the full open position.



Quadrant and offset lever with flume-type gate insure positive spotting of closure in tank.

Pivoted Anchorage Prevents Guy Chafing

To prevent chafing of two guy wires carried on a single hitch, and also to simplify the tightening of either, one company uses a special post, set in a concrete block of size ample to withstand maximum pull on the wire. The steel post carries a bracket, offset toward the derrick, in which is drilled a hole to carry a pivoted anchorage, having accommodation for the eyes of the two turnbuckles used for guy-wire tightening.

GUY LINE ANCHOR

This segregation of guys prevents whipping or tangling, enables either to be strung and used without the other, and allows the use of a sheave in place of grommet on the upper or main guy wire.

To recover the steel center from the concrete anchorage, an adobe shot, using sufficient explosive to split the block, serves to free the post and permit its use at the next setup.

Swiveling, with separate eyes for dual guy hitches, this unit insures proper lead-in.

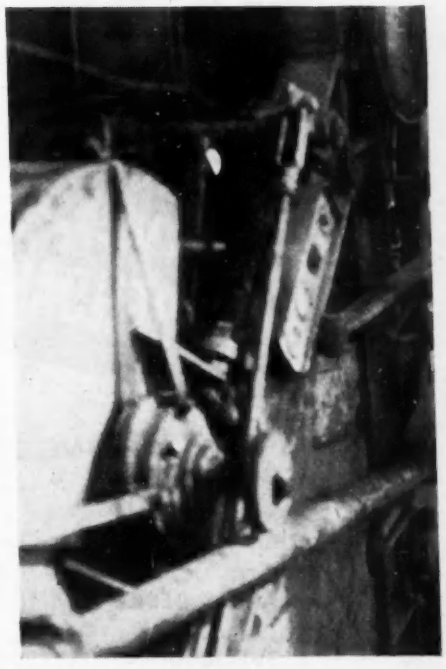
Drawworks Shaft Stub Carries Grinding Unit

A small grinding wheel is a necessity around the drilling rig, the most common type being the geared hand-powered unit which clamps to the workbench, a step or other convenient mounting site.

POWER GRINDER

One tool pusher solved the problem of finding the second man to turn the stone while a grinding job was done by having a short stub welded to the projecting end of the high-speed shaft in the drawworks. This stub shaft is carefully centered before welding in place, so as to insure concentric rotation with the big shaft, and then threaded to take backup and lock nuts. A 5-, 6- or 7-inch grinding wheel is mounted between supporting washers on the shaft, being spotted by adjusting the nuts to proper location.

Although the speed of the wheel on the drawworks shaft extension is not as high as might be desired, due to clear-



Welded to end of high-speed shaft, special stub carries wheel for rig tool sharpening.

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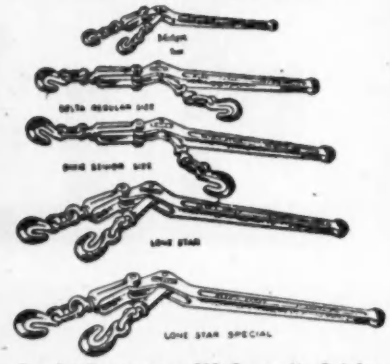
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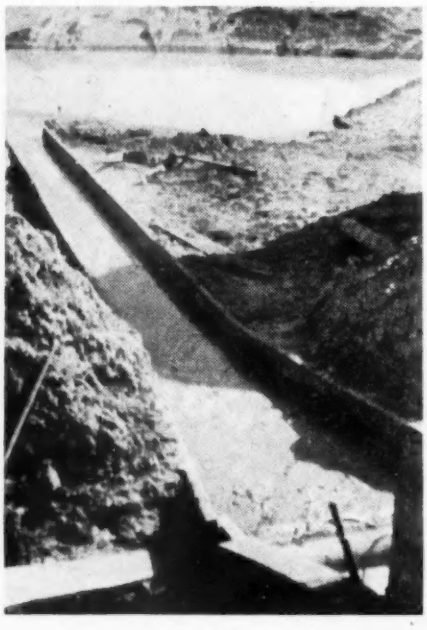
ance limitations which prevent the use of larger diameter wheels, the uniform speed and absence of vibration enable such a grinding unit to do much more accurate grinding than can be secured in like time with a hand-operated grinder—and the second man is still left free to go about the other work demanding his attention.

Steel Bottomed Ditch Prevents Loss of Mud



Timber sides on tank steel base prevent contamination of intermediate stretch of soil.

LOCATION PROTECTION

To facilitate re-use of the ground immediately around the drilling rig, one landowner insisted on provision for keeping the drilling mud from contaminating the topsoil. In place of the usual timber flume for mud return between shale shaker and pits, a combination unit was built up using discarded tank steel for the bottom, and 2x8-inch lumber for the sides. The junction between steel bottom and wooden sides was made by nailing through holes in the steel, the first pass of mud sufficing to seal the joint and prevent loss to the soil.

The steel base serves to give required stiffness to prevent the alternate swelling and shrinking which opens cracks in the timber flume, and also gives a smooth base on which the tendency for the mud to collect is reduced to a minimum. The unobstructed metal bottom may be scraped clear simply by making one pass down the flume occasionally with a wide wooden hoe or scraper. The steel bottomed flume is heavy enough to hold position even though the ground be flooded by heavy rainfall.

Twinned Exhaust Lines Simplify Connections

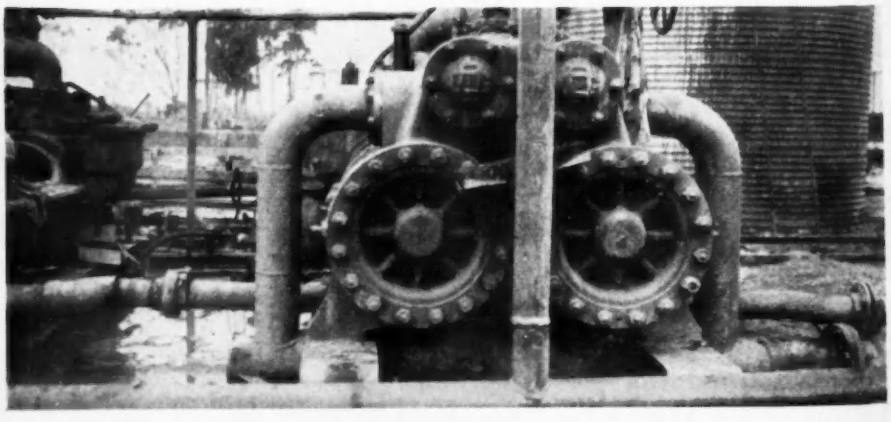
Where a dual exhaust line is designed into a steam pump, the usual piping plan involves the tightening or breaking out of a pair of unions, one on either side of the pump casting, every time the unit is moved.

SPEEDING RIGGING-UP

One contractor mounts his pump on a heavy skid so that a stub exhaust header can be run through the webs of the two main structural members of the skid, with a flange on one end for connection to the exhaust line—the other end being blinded with a flange or a welded-in plug. The two exhaust lines are brought down to taps in the top of this header, all joints save the flanged connections to the pump casting ports being welded so as to eliminate points of potential leakage.

With such a twinned exhaust connection there is only the main flange connection to be made up or broken out, and the connections, studs, and gasket surfaces in the pump casting are not subjected to the possibility of damage through frequent work. The short stub carrying the flange is such that the end does not seriously overhang the skid, and thus adds no problem to handling on the usual heavy-duty truck.

With a pipe supported firmly in the skid beams, any vibration imparted to the exhaust by exhaust pulsations is snubbed, and the pump casting is protected against possible damage from this source.



Carried in holes through webs of skid beams, manifold is welded to separate drop legs, with only flange connections to be checked against possible loosening through vibration.

Alert Effort Minimizes Thefts from Leases

From a mark of more than a million dollars yearly Texas loss from oil field thievery has been reduced materially. Active campaign develops a procedure calling for careful marking and close cooperation

IN 1937, annual loss to the oil industry from theft of property and equipment was running more than a million dollars yearly. Thieving in the oil fields was a lucrative trade. From the 20,000 leases scattered over Texas vast quantities of supplies were taken, sneaked out under cover of darkness, loaded onto trucks and into cars, speedily hauled away, and delivered to a "fence." Through this broker of stolen goods, the market flourished. The racket was well organized and sales were frequently made in states far removed from where the items were taken.

To help combat this situation, the Texas Mid-Continent Oil & Gas Association, representing the oil industry of Texas, appointed a committee of oil men to work out a program of theft prevention. Begun in 1937, the program has been very successful. Within a year from its beginning, 56 thieves had been sent to the penitentiary and 39 others were under heavy bond awaiting to be tried. Up to now convictions have totaled 231, and the traffic has been largely wiped out.

To accomplish this has required the cooperation of peace officers in all Texas counties, the Texas Rangers, the Federal Bureau of Investigation and members of the oil industry. Reviewing the problem in a "Theft Prevention Handbook for The Texas Oil Industry," the Texas Mid-Continent Oil & Gas Association urges oil companies to participate in the effort to further stamp out this illicit business. An outline of procedure in carrying on the fight is suggested by the Association as follows:

Outline of Procedure

1. The Texas Mid-Continent Oil & Gas Association acts as a central agency through which all thefts should be reported.

2. The agency will advise peace officers and other law enforcement agencies that might assist in apprehension of the thief and recovery of the property.

3. Ask all operators to place identifying marks on property and equipment where they could not be erased or readily recognized by thieves.

4. Payment of rewards to peace officers for apprehension and conviction of thieves.

5. Place reward signs on properties as a warning to thieves.

6. Employ special agents to work with peace officers throughout the state to coordinate their efforts in theft apprehension.

7. Concentrate efforts to apprehend and eliminate all "fences" for stolen oil industry property and equipment.

Most commonly reported stolen items include: wrenches, belts, boilers, jacks, spiders, slips, pipe, tubing, nitro-glycerine, valves, paint, lubricating oil, gasoline, fish-tail bits, tongs, elevators, chain hoists, electric motors, automobiles, pumps, adding machines, radios, mercury, wire lines, crown blocks, oil tanks, an entire drilling rig and equipment, and pipe from pipelines.

Discussions with peace officers and law enforcement agencies interested in the work, indicate that losses could be greatly reduced if more care were exercised by the industry. Peace officers recommend the following to oil companies:

1. Know your employe. He may be highly qualified for the job that he is to fill in your organization, yet his character and criminal record, if such existed, would prevent him from being employed. This may be determined by finger printing and having them checked by some reliable bureau, such as the Department of Public Safety at Austin, Texas. This procedure never hurts an honest person; it serves to prove his worth.

Close Watch Advised

2. If tools and materials are being moved to a new location, keep a watch on them until set up and operations are started by drilling crews. Should some unforeseen trouble arise which necessitates a shut-down, post a watchman; as many times there are thieves near by waiting for a chance to catch everyone gone from the location. A watchman's pay would be very small in comparison to the loss of tools or materials. Many times the men in charge of a drilling rig become lax and think because their location is a long distance from the main traveled highways that a thief would not bother anything. This is where a loss generally occurs as the thief has plenty of time to load up and haul off what he wants without being discovered.

3. When a well is finished all tools and materials which are not needed in the near future should be moved to a place of safety and properly stored. Leaving them on location without proper protection invites theft.

4. Proper marking of all tools and equipment would save the industry untold sums of money in the protection of properties. All companies and individuals should have a mark or brand registered with the central organization where it could be referred to at any time a loss occurred. This brand or mark should be placed on all equipment in a uniform way so that it can be recognized. It is preferable to brand material with a steel stamp or burn in with a welding torch. Paint, chisel marks, chalk and other similar marks are not sufficient since other parties can use the same markings. Many recoveries of valuable material have never been made to the rightful owners due to the fact that the owner or agents were unable positively to identify their equipment. For this reason a number of thieves have escaped punishment. Not only did they escape just punishment for their deeds but they had their lawyers demand the return of the loot to them. This is adding insult to injury.

Need for Markings

5. Court procedure in reference to unmarked or improperly marked materials being identified by the owner or employe puts the owner or his representative in a hazardous position due to the fact that he is unable positively to identify his material. The accused thief may then start civil procedure claiming "defamation of character." Some such lawsuits have occurred in the past. Many good officers have lost their case in court after having worked for months trying to run down some old hardened thief or "fence" on account of the above.

6. Various methods are employed in the prevention of warehouse thefts. In considering location of the warehouses which in most cases are near the city limits in small towns, burglar alarms are recommended in some instances, with proper closing and locking of all doors and windows. However, locks do not prevent theft in many instances. They denote the sign of private property and keep honest people honest. Secret code numbers stamped on oil cases in small numerals help in the positive identification and prosecution. Consignee's number assigned to him may be stamped on each case shipped.

"Confession of the thieves," according to the handbook, "taken at that time disclosed many clues to why and how organized crime could invade this field and attain such a startling magnitude, permitting the largest industry in the Southwest to suffer tremendous losses. Tools poorly marked, and often entirely unmarked, for identification; the unguarded and stacked rigs; the many sleeping watchmen; and the often evident lack of interest in employe by employer."

Though oil industry thievery has been reduced to a minimum through state-wide cooperation, a warning is sounded by the handbook. "A large number of the old timers are still behind the bars; other have actually gone to work in war plants, and some are in the armed forces, but with the advent of peacetime, we may look for a resumption of their depredations. With organized effort, their former bold industry-wide operations can scarcely gain a foothold again."

Thrift and Social Security Plan Gains Wide Acceptance by Employes

A profit-sharing plan which encourages thrift among employes, accumulates $101,000,000 for their benefits in a relatively short time, and embraces 95 percent of the company's personnel is the Employe Thrift Plan of Standard Oil Company (New Jersey). It is the outgrowth of several social security and individual thrift programs sponsored by the company. More than 40 years ago, Standard started with a simple pension plan provided wholly by the company. Sickness, disability and death benefits were added to liberalize and expand the pension in 1918, while workmen's compensation laws were supplemented with accident benefits.

Then in 1920 the plan was further enlarged by enabling employes to acquire company stock through employe and company contributions. The new idea proved as popular and many thousand workers accumulated their first capital investment in private stock. Most of the stock bought then is still held by the original purchasers in spite of the depression of the 30's.

The next important step in the security program, as told in *The Lamp*, was in 1932 with a pension program which placed promised benefits on a contractual basis not subject to reduction. Group life insurance was introduced to more than double the free death benefits.

Finally on January 1, 1936, the Thrift Plan emerged full form and replaced the annuity plan then in effect. The stock purchase arrangement also was discontinued. As defined by the company, "This plan is a combination program of pensions and savings which serves both to supplement the old age and survivors' benefits provided by the Federal Social Security Act and the unemployment compensation provided by the state laws."

The plan, all-inclusive, is open to employes from top to bottom. Since it was started, 40,000 workers have put aside an average of $2,525 apiece, of a grand total of $101,000,000.

Proving its worth through almost unanimous acceptance by employes, the plan's high points are:

1. The employe satisfied with the government program alone may stay out of the company plan if he chooses.
2. All company funds become the property of participating employes as soon as contributed. These funds are not returnable to the company under any circumstances.
3. An employe may choose one of a number of rates of contribution and thus decide how much social security he wishes to build for himself and family.
4. It is pay-as-you-go for both employe and employer.

The range of employe contributions can vary from three to 13 percent of wages with the first three percent matched dollar for dollar by the company. Above that, for each employe dollar, the company adds fifty cents. Thus the regular contributions may run as high as employe 13 percent, company 8 percent, or a total saving of 21 percent of wages. Maximum participation is shared by almost one third of the company's workers. Participating companies make additional contributions when management deems it advisable. Up to June 30, 1943, these additional contributions had totaled nearly $19,000,000.

For the purpose of purchasing group annuities, the employe may choose any figure ranging from the amount of the company's regular contributions up to double that sum; thus the amount available for annuities may go as high as 16 percent of wages. Employes may vary from time to time their annuity allotments as well as their rate of contributions.

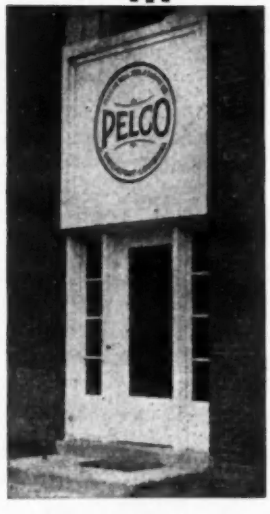
If an employe leaves the company before retirement, the annuity he has accumulated, plus interest, may be converted to cash if he so desires, or if he needs more cash than his cash savings in the fund. The portion of his annuity bought with company funds is payable to him only as a pension at any time after the age of 55 for men, (50 for women), and cannot be cashed. An employe's balance in the thrift fund and his contributions for annuities plus interest are payable to his beneficiary in the event of his death before retirement. An adjusted annuity can be arranged at retirement by an employe, to be continued during the lifetime of his widow as well as his own, thus supplementing the widow's pension provided by the Social Security Act.

To meet the need for current funds, withdrawals are permitted, subject to the condition that the total of such withdrawals may not exceed one third of the total employe and company regular contributions. Should the employe be laid off, leave or quit the company for any reason, he immediately receives his cash balance in the fund. Emergency needs may be met by withdrawals as indicated above. Of the company's additional contributions, the employe may take out one-half. The rest is kept in the fund to boost the individual's capital accumulations.

Of the total accumulated, approximately one third, or $33,666,000 has gone to buy insured annuities. A like amount has been withdrawn to reduce indebtedness, cover medical care or other emergency requirements, or to purchase war bonds. The other third remains as cash or securities.

It May Be They Mean Well

It may well be that most of the bureaucrats mean well. We can understand how a man bred in the city and thrust suddenly into a farm bureau might have some very quaint ideas about husbandry. And we can understand how a man schooled only in politics might have some equally naive theories about business. We all know how a violin is played, and so we can understand how a well-meaning fool might tell Fritz Kreisler how to improve his technique. Our quarrel is not with bureaucrats, but with the principle of bureaucracy. When this war ends we want for enterprise—our enterprise—the freedom and privacy and competitive rewards we enjoyed for so many of our 36 years in the supply business. Meantime, TRY PELCO FIRST. We are not wholly regimented.



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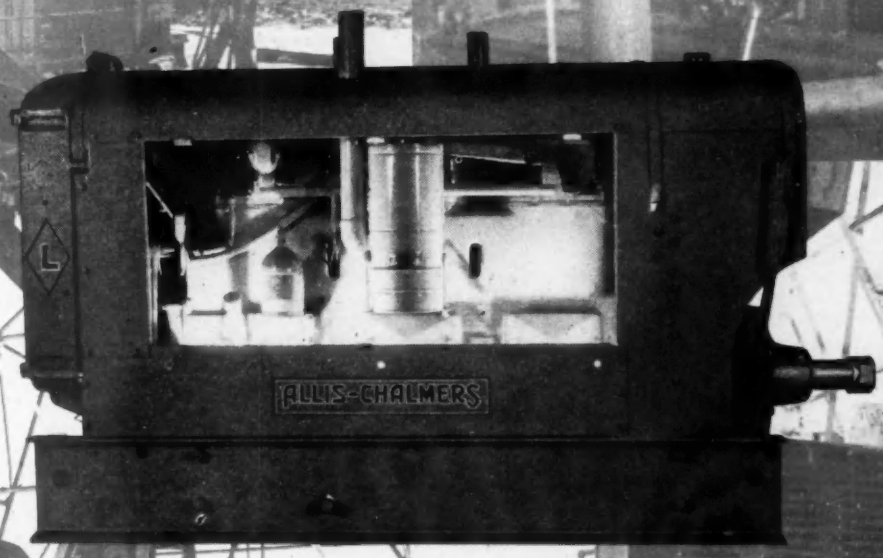
Natural Gasoline Plant For the Hildreth Pool

Continental Oil Company is erecting a combination natural gasoline plant and re-cycling unit in the Hildreth field, Montague County. The project will process 2,000,000 feet of gas daily, using 12-inch pipe for the intake system and 4-inch pipe for distributing the compressed gas. Plant is on the company's Steed lease, embracing S½NW¼ Section 56. The Hildreth field is the third largest deep area in North Texas.

YOU PICK THE HOT SPOTS



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Refinery Runs Reduced but Production Of Products Still Comparatively High

For the first time in several weeks, runs to stills were cut back in the week ended June 24, but crude oil production set a new all-time record. The refinery runs still were exceptionally high, in spite of the reduction, as new all-time peaks had been reached every week for several preceding weeks.

Production of principal refined products declined, in reflection of the smaller volumes of crude charged to stills, but still remained high enough to result in accumulation of gasoline, distillate fuel oil, and residual fuel in storage.

Crude runs to stills at United States refineries averaged 4,638,000 barrels daily, representing utilization of 94.5 percent of the rated capacity of 4,908,000 daily. The runs were off 114,000 barrels per day from the previous week's all-time peak, but were 631,000 a day or 15.7 percent higher than in the week ended June 26 last year.

Production of crude oil averaged 4,583,000 barrels a day, a new peak, up 15,000 from the week before and 628,000 daily or 15.9 percent higher than in the corresponding week last year. Stocks of crude oil were further reduced 725,000 barrels during the week ended June 17 to 230,565,000 barrels and at that level were approximately 13,000,000 barrels or 5.3 percent under the 243,516,000 barrels reported for the corresponding date last year.

Gasoline production, including natural blended at refineries, averaged 2,010,000 barrels daily, down 47,000 from the week before, but 389,000 daily or 23.8 percent above output in the like week last year. Stocks of finished and unfinished gasoline contra-seasonally increased at the rate of 105,000 barrels daily to a total of 86,000,000 barrels, and that amount was 7,040,000 barrels or nearly 9 percent above the 78,960,000 barrels reported June 26 last year.

Gasoil and distillate fuel oil production averaged 619,000 barrels daily, down 76,000 from the week before but 78,000 barrels daily or 14.5 percent higher than in the corresponding week last year. Stocks of these oils were increased by 27,000 barrels daily to 34,328,000 barrels, and the latter quantity was about 2,000,000 barrels or 6.5 percent above the 32,232,000 barrels on hand June 26 last year.

Residual fuel oil production averaged 1,280,000 barrels daily, down 75,000 from the previous week but 133,000 barrels a day or 11.6 percent more than output in the week of June 26 last year. Stocks of residual accumulated during the week at the rate of 105,000 barrels daily and rose to 52,757,000 barrels. That quantity was 14,483,000 barrels or 21.5 percent less than the 67,240,000 barrels of stocks held on June 26 last year.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.
(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11–22	4,120	10–18	266,187	3–29	99,727	3–29	[5]54,983	11–15	102,448	1– 4
1942	4,337	2– 7	3,961	1– 3	263,208	3–28	[1]109,281	3–14	49,861	11–14	95,857	1– 3
1943	4,436	11–13	4,331	12– 4	245,752	5–29	94,159	3–20	46,187	11–27	72,881	1– 2
1944	[4]4,583	6–24	[4]4,752	6–17	240,992	1– 1	89,162	4– 1	42,310	1– 1	57,330	1– 1
Lows:												
1939	[3]1,601	8–26	3,125	2–18	[2]229,127	10–12	71,152	10– 7	20,722	4–15	105,397	4– 8
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,381	4–12	90,914	7–12
1942	3,297	7– 4	3,393	5–23	231,896	12–12	75,934	12– 5	29,240	4–25	72,962	12–26
1943	3,821	1– 9	3,579	3–13	232,191	1– 9	68,182	10–16	30,732	4– 3	57,596	12–25
1944	4,357	1– 1	4,228	2–12	230,565	6–17	76,302	1– 1	30,232	4–29	49,737	3–18

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 29	4,431	4,300	235,342	13,126	88,462	4,284	30,236	8,398	49,985
May 27	4,514	4,532	234,423	13,502	86,468	4,702	32,035	8,568	49,812
June 3	4,523	4,620	234,476	13,680	87,084	4,890	32,586	9,157	50,283
June 10	4,523	4,670	231,290	14,220	86,911	4,996	33,669	9,008	51,221
June 17	4,568	[4]4,752	230,565	14,398	85,268	4,870	34,137	9,489	52,017
June 24, 1944	[4]4,583	4,638	.....	14,066	86,000	4,337	34,328	8,961	52,757
June 26, 1943	3,955	4,007	[2]243,516	11,360	78,960	3,788	32,232	8,033	67,240
Change:									
In week	+15	−114	−725	−332	+732	−533	+191	−528	+740
In year	+628	+631	−12,951	+2,706	+7,040	+549	+2,096	+928	−14,483
In year	+15.9%	+15.7%	−5.3%	+23.8%	+8.9%	+14.5%	+6.5%	+11.6%	−21.5%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Stocks, June 19, 1943.

Pipe Line Review

Big Push Through Big-Inch Called for By War Demand

With war requirements at a new peak, PAW will push all the crude oil possible through the Big-Inch pipe line, and last week issued operating schedules calling for the movement of 320,000 barrels daily through the next three months.

The schedules call for the movement, daily, of 133,000 barrels of East Texas oil, 70,400 barrels from Southwest Texas, and 116,600 barrels from West Texas.

Of the total of 9,920,000 barrels scheduled for delivery in July, 3,292,200 barrels will be taken from Humble Oil & Refining Company, 1,760,800 barrels from The Atlantic Refining Company, 1,249,300 barrels from Sun Oil Company and 1,081,900 barrels from Gulf Refining Company.

Pipe Line Projected from Pools to Sinclair Refinery

Sinclair Refining Company has asked for bids for laying 17 miles of 8-inch pipe from the Wertz and Lost Soldier pools to its refinery at Sinclair, Wyoming. The line will replace an old 6-inch which will be reconditioned and used on other gathering systems. So far the company has been unable to obtain 8-inch pipe for the project which has been approved by WPB.

Pipe Line from Elk Basin Pool Is Making Progress

Good weather is facilitating construction of Stanolind Pipe Line Company's 240-miles of 12-inch pipe line from the Elk Basin pool in Wyoming to Casper. The line will have an initial capacity of 15,000 barrels daily with most of the oil being moved primarily from the Elk

Basin field to the Casper refinery, with laterals tapping the Little Buffalo, Salt Creek and Oregon Basin pools. Sharman & Allen and I. C. Little have the contract.

Shell to Ask Bids on Various Pipe-Line Jobs

Shell Pipe Line Company is asking bids for laying 10 miles of 6-inch and taking up of 16 miles of 6-inch and laying 100 miles of 6-inch between Tonkawa and Cushing stations.

The first job involves taking up the line from the Wale Station, near Oxford, to the Rainbow field in Kansas. This pipe will be reconditioned and included in the Tonkawa-Cushing line which will be a double 6-inch. The work will be in charge of L. F. Young, superintendent, and C. E. Dolhonde, area chief engineer.

Stanolind Increases Flow Of Crude to Drumright

Stanolind Pipe Line Company has stepped up its shipment from the north end of the West Texas Permian Basin to its pipe-line junction and tank car loading terminal at Drumright, Oklahoma, to a new peak of 71,000 barrels daily. This 16-inch carrier was given a conservative rating of 65,000 barrels daily, using 2 stations, but efficient station operation along with summer weather accounts for the increase. Materials for 2 additional stations that will enable the line to average 86,000 barrels daily are due to be delivered by mid-July.

Delay in Pipe Holds Up Shidler-Blackwell Line

Delay in obtaining 16-inch pipe is holding up construction of Cities Service Gas Company's gas line between Shidler and Blackwell, Oklahoma, the contract for which was awarded to Oil States Construction Company. Contractors believe they will get pipe August 10 and are ready to start work, which includes one river crossing, with prospects that the line will be completed in 45 days.

Pipe Line Intangible Values Show a Decline

The State Tax Board last week released final intangible tax valuations for pipe lines operating in Texas, listing a total of $27,487,135. This is $2,860,365 less than the values for 1943. The reduced earnings result from lower rates, rather than the handling of a lower volume of oil.

To Recondition Pipe

Approximately 60 miles of 4-inch and 6-inch pipe comprising Empire Pipe Line Company's line between Okmulgee and Seminole, Oklahoma, has been taken up by Goldenstern Pipe & Supply Company which bought the pipe for reconditioning. O. C. Holder, superintendent of the supply company, was in charge of the project.

Opens Nashville Office

Guy S. Connors, vice president in charge of operations for Williams Brothers Corporation has opened headquarters at Nashville, Tennessee, to facilitate supervision of his company's construction of pipe line on the Tennessee Gas & Transmission line. He moved to Nashville from Monroe, Louisiana.

International Developments

Argentina and Colombia Preparing New Oil Laws

The governments of Argentina and Colombia have formed special committees of their councils of state, charged with the task of revising petroleum laws for submission to their respective congresses in July. It is reported that both countries desire to obtain greater development of petroleum resources through more favorable legal arrangements with British and American companies, and that all government groups will cooperate in effecting passage of fair and up-to-date petroleum laws. The proposed new laws of both countries are said to contain clauses to be inserted in all future concession contracts which require payment of extra royalty amounting to one half of one percent to provide funds for the education of native engineering students in American universities.

Russian Drilling Rigs Released to Chinese

The Soviet government, after partly developing the Tushan oil field in Sinkiang province, China, by special arrangement with the Chinese government, has turned over operations to the Chinese, and has sold to them several percussion-type drilling outfits for use in further developing the field. It is reported that Russian technicians have trained Chinese crews in operating the rigs and in carrying on all other activities involved in developing the field.

Peruvian Government Oil Work Unpromising

The government of Peru, operating its own drilling rigs in the Pirin area, near Lake Titicaca, has reported poor results after putting down a number of holes in the past 12 months. The Lake Titicaca zone, extending from Puno to the Ramis River, consists of an anticlinal structure interrupted by folds and faults in formations of schists, sandtone, limestone and conglomerate. Seepages of petroleum, gas and salt water occur along many of the fault traces that cut the main structure, but no important commercial production has yet been found in the locality. The Pirin field produced only 284,000 barrels in the 10 years of its history, beginning in 1906. It was abandoned in 1915 when the wells went to water. The Peruvian government is now carrying on areal surveys of four unexplored and supposedly petroliferous areas east of the Andes.

Many Applications for Venezuelan Concessions

In response to the invitation issued by the Venezuelan government late in March of this year, calling for more comprehensive geologic and geophysical exploration of prospective petroleum lands, applications for exploration concessions are being filed at a record rate. According to a release from Caracas, applications filed during a four-week period in April and May totaled more than 3,000,000 hectares of land. In addition, the Venezuelan Ministry of Development has announced that it will soon call for bids on government properties in proved areas.

Sinclair Will Build Refinery in Venezuela

Following announcement of the formation of two Sinclair Oil Corporation subsidiaries in Venezuela, the company has revealed that it plans to build a 35,000-barrel refinery at the Puerta La Cruz terminal, for the production of 80-octane gasoline and diesel fuel oil. The plant will include crude and cracking stills, and acid plant, electric generating plant, housing for workers, hospital and school.

Gaspe Well Nearing Completion Depth

With only about 100 feet of hole remaining to be drilled before reaching expected production, Continental Petroleum's No. 2, on the Gaspé peninsula in Eastern Canada is being reamed to 1400 feet, in order to set 8⅝-inch casing to that depth. Present hole bottom is at 1955 feet, and total expected drilling depth is estimated at 2058 feet. The balance of the hole will be cored. The well is 113 feet from a well drilled in 1896, which encountered high-gravity oil at 2058 feet, and which is still flowing.

South African Shale Oil Plant Is Now Operating

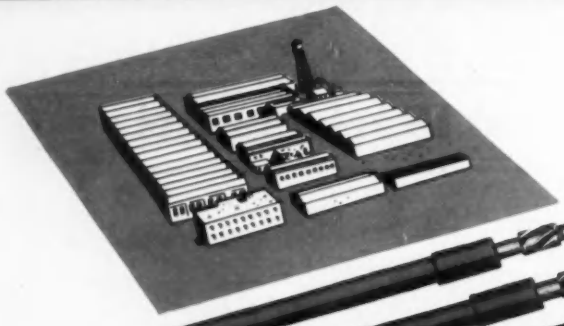
South African Rorbanite & Refining Company, owned by Burmah Petroleum Company, has completed construction of its shale-oil extraction plant at Ermelo, and is now processing rock at capacity rate. The plant is designed to produce some 100,000 barrels of shale oil annually. The Ermelo plant and shale pits are 100 miles east of Johannesburg, in the Transvaal State, near the headwaters of the Vaal River. Oil shales outcrop along the river in the eroded western slopes of the Drakenberg Mountains.

Oil Discovery In Turkey

It has been reported, without details or confirmation, that oil has been discovered "at great depth" in southern Anatolia, Turkey. More specifically, the discovery is reported to be west of Burdur, in the Gerenis valley. Accounts as to productivity vary widely.

Air and Ground Surveys Being Made in Bahamas

Air and ground surveys are under way in the Bahamas with the object of making an appraisal of the petroleum possibilities of the island group. It is believed that recent and current wildcatting campaign in southern Florida is responsible for interest on the part of the British in the potentialities of their own nearby lands. This interest is being concentrated on Andros Island, the largest in the Bahamas group, where detail work is reported to be in progress.



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DEEP WELL PLUNGER PUMPS

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U. S. Field Operations

Oklahoma

Discovery of Important Pools Feature of Week

Mid-Continent Petroleum Corporation's Westermier 1, NE SW SW 26-10n-3w, Cleveland County, has opened another Second Wilcox sand pool west of the Nemaha Ridge and 3 miles east of the West Moore pool. Perforated with 95 shots at 8833-65 feet, the well immediately cleaned itself and during the first 24 hours flowed 40 barrels of 39-gravity oil an hour and 5 million feet of gas, through 24/65-inch choke, with the flow increasing steadily. Upon completing test, the well will be pinched in to 300 barrels per day.

Phillips Petroleum Company extended the West Edmond pool a mile northeast and proved approximately 40 new locations as Gomer 1, SWc NW 16-14n-4w, Oklahoma County, was preparing to test 70 feet of saturated Bois D'Arc (Hunton) section topped at 6600 feet. Total depth is 6746 feet with pipe set at 6663 feet. After washing and flowing a trickle of oil the well was waiting to kick off. South of the pool and slightly more than ½ mile from the nearest producer, Anderson-Prichard Oil Corporation's Crookham 1, NW SE 9-13n-4w, set pipe at 6942 feet and was preparing to test highly saturated Hunton lime from 6770 to 6831 feet. Hole is bottomed at 6943 feet.

Garvin County: A little more than a mile east of Helmerich & Payne's shallow strike in the Hoover Northeast pool, W. A. Delaney, Jr., opened another "grass roots" pool when Russell 1, SW SE SW 12-1n-1w, flowed 10 barrels of 43-gravity oil and 2 million feet of gas per hour from 1332-65 feet.

Lincoln County: Sinclair Prairie Oil Company's Danker 1, SEc NW SE 28-14n-3e, which blew out and caught fire has been brought under control and another rig is moving in to replace tools which were destroyed. The gas flow, estimated at 30 million feet daily, is believed to be from a stray lime section in the Oswego.

Grady County: In the Chickasha gas pool, Skelly Oil Company is preparing to swab Goodwin 1, C SE NW 8-5n-8w, wildcat bottomed at 10,404 feet at the base of the Hoxbar or top of the Deese. Sands to be tested were cored in the Medrano and Marchand sections topped at 8850 and 9583 feet, respectively.

Oklahoma County: Rapid development of the Arcadia pool opened by Jordan Cab Company's Williams 1, SW SE SW 11-14n-1w, is under way with Jordan drilling below surface casing in Lynn 1, SW NE NW 14-14n-1w, a south offset, and rigging Shannon 1 and Bourne 1-B, east offsets to the discovery well which continues to flow at the rate of 47 barrels of high-gravity oil an hour from Second Wilcox at 5980-97 feet. British American Oil Producing Company is running the oil and shipping it by tank car to its Canadian refineries.

Grant County: Northern Ordnance's Whitworth 1, NW NE SE 3-25n-3w, 2½ miles northeast of the Lamont pool, is a failure at 5410 feet after testing 13 feet of dry Wilcox sand. Mississippi lime was topped at 4815 feet.

Carter County: Continental Oil Company's Fowler 1-A, NW SE SW 31-2s-2w, ran electric log after setting 7-inch at 7132 feet and bailed out to 7080 feet, testing a small amount of oil. Sand was logged at 6898-6914 feet and after testing, a slight show of oil came in through broken collar at 6910 feet. Perforated with 67 shots at 6894-6914 feet the oil fill-up was 1500 feet; reperforated with 38 shots at 6667-6710 feet there was no increase; reperforated with 20 shots at 7025-33 feet hole bailed down, recovering 100 feet of mud and 1750 feet of oil in hole with an estimated 100,000 feet of gas. The well is shut in for tankage.

West Edmond Revisions To Be Sought at Hearing

The Oklahoma State Corporation Commission on July 13 will hear an application by Walter T. Pound, chief conservation officer, calling for drilling rule revisions in the West Edmond field, Oklahoma and Canadian Counties, which include setting of longer string of surface casing, establishment of gas-oil ratio rate and determination of flow on leases having more than one producing well. Operators desiring other revisions in the rules will present them at the hearing.

Kansas

Fifteen Percent of 1944 Wildcats Open New Pools

A field check of Kansas wildcats drilled since the first of the year reveals that 15 percent of the operations have opened new pools, a total of 228 wildcats having been reported of which 35 were strikes—30 oil and 5 gas discoveries. Last week Kansas had 80 wildcats drilling compared with 63 at the same time last year.

Ness County: Skelly Oil Company's Norton 1, NWc 23-17s-26w, is a pool opener good for 125 barrels of oil daily. Production is from Mississippi lime topped at 4449 feet. Pipe was set at 4450 feet and the well, after acidizing with 750 gallons at 4450-61 feet, swabbed an initial 4 barrels of oil an hour. The strike is 3½ miles northwest of the Aldrich pool.

McPherson County: Derby Oil Company's Ray 1, NEc 1-19s-2w, 1¼ miles northeast of the Ritz field, is a probable pool opener. On a drill-stem test in Mississippi lime at 2977-96 feet, the pipe had a fill-up of 1440 feet of oil and 240 feet of water. Pipe was set at 2974 feet with top of the Mississippi lime reported at 2973 feet.

M. & L. Oil Company in a two-well play is seeking lower pay in the Linds-

Wells Completed in the United States in Week Ended July 1, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS This Week	Last Week	Cumulative This Year	Cumulative Last Year
Alabama	1				1						1	1	14	1
Arizona													3	
Arkansas	2				2		1		1	2	4	5	96	132
California	32				32	2					34	36	1,001	668
Colorado									1	1	1		12	10
Florida												1	1	
Georgia													1	2
Illinois	28				28	2	3		7	10	40	40	802	836
Indiana									1	1	1	9	130	125
Iowa													2	3
Kansas	19	1	1	8	29						29	56	839	777
Kentucky	6			3	9	1			3	3	13	17	327	145
Louisiana	11			3	14		1	1	3	5	19	19	359	298
North Louisiana	5			2	7		1	1	3	5	12	10	120	130
South Louisiana	6			1	7						7	9	239	168
Michigan	5	1		2	8				2	2	10	34	308	241
Mississippi	3			1	4				1	1	5	15	71	41
Missouri													9	10
Montana	7			1	8		1			1	9	6	153	106
Nebraska													7	24
New Mexico	11			2	13						13	5	210	124
New York	15		10		25						25	25	638	566
Ohio	4	5		1	10	1					11	2	343	415
Oklahoma	21	1	1	7	30				4	4	34	53	852	643
Pennsylvania	27	1	15	1	44						44	49	1,379	1,215
Tennessee													6	5
Texas	76	6		12	94		8	2	31	41	135	127	2,947	1,886
E.Tex.Bor. Co.'s									2	2	2		12	13
E. Texas Field													3	5
Rest of E. Texas	1			1	2				2	2	4	8	147	111
North Texas	13			4	17		2		8	10	27	29	685	430
W. Central Tex.	7	2		1	10				1	1	11	8	199	159
West Texas	24	1		2	27				9	9	36	25	785	431
Tex. Panhandle	8				8						8	2	114	103
G. Coast, Upper	7	3		3	13		2		2	4	17	17	275	140
G. Coast, Lower	9			1	10		4	2	4	10	20	20	453	288
Southwest Texas	5				5				3	3	8	15	224	173
S. Central Tex.	2				2						2	3	50	33
West Virginia	3	10		1	14	1					15	22	456	284
Wyoming			1		1		1			1	2	6	79	59
Total U.S.	271	25	28	42	366	7	15	3	54	72	445	528	11,045	8,616

* Includes distillate wells. † Includes salt water disposal wells.

borg pool. Carlson 1, SE NE 7-17s-3w, deepened from 3373 feet, old total depth, to 3493 feet, had a showing in the crystalline Viola topped at 3361 feet. Johnson 2, C W½ SE SE 7-17s-3w, after acidizing with 1000 gallons at 3346-3404 feet in crystalline Viola, swabbed 45 barrels of oil in 2 hours and testing continues. Production in the Lindsborg pool is from the Maquoketa Viola.

Sumner County: M. J. Sullivan's Nixon 1, C NE NE 22-30s-1w, 1¼ miles southwest of the Zyba pool, after drilling plug and deepening to 3929 feet, filled up with 3000 feet of oil in 4 hours and later flowed 25 barrels of clean oil in three hours. Pumping rig is being set up.

Pratt County: Skelly Oil Company is moving in cable tools on Schaw 1, NWc 4-29s-13w, 3 miles north of the Coats pool, where the Simpson sand on drill-stem test at 4485-95 feet showed oil and gas-cut mud. Mississippi lime was topped at 4302, Kinderhook at 4393, and Viola at 4421 feet. Total depth is 4588 feet.

In the new Coats pool, Lion Oil Refining Company's Chastain 1, SE NE SW 24-29s-14w, abandoned at 4637 feet. Simpson sand, producing horizon for the pool, was topped at 4533 feet and Arbuckle at 4618 feet. The company's Allen 1, SE NE NE 25-29s-14w, abandoned at 4785 feet after tests of Simpson and Viola topped at 4681 and 4746 feet, respectively, recovered salt water.

Barton County: Phillips Petroleum Company's Chaloupa 1, NE SE NW 25-16s-14w, a mile north of the Barrett pool, is drilling below 3427 feet. J. H. Hershey et al's Sanko 1, NW SW 19-20s-11w, after testing a slight oil show in the Arbuckle, abandoned at 3392 feet.

Illinois Basin

Two New Pool Openers Reported During Week

Washburn and Gibson have a pool opener at Ansbury 1, NE NE SE 9-1n-9e, Wayne County, 4 miles from production in the Clay City pool. Pipe is set to test McClosky lime at 3235-44 feet, the latter total depth.

Edwards County: Nash Redwine's Jones 1, SE NW NE 31-1n-10e, 4 miles southwest of the Bible Grove pool, has opened a new pool with production from the McClosky lime. The well swabbed 400 barrels of oil in 24 hours from pay at 3235-45 feet. It is going on pump for additional tests.

Jefferson County: Arthur Carmeron and others' Watkins 1, NW SE NE 24-2s-1e, was abandoned at 2422 feet, and Nash Redwine's Laux 1, was drilled to the Devonian lime at 3765 feet but was abandoned after plugging back to 1970 feet.

Clinton County: J. B. Findley's Wedekemper 1, NW NW SW 33-3n-1w, a wildcat south of Boulder, has been abandoned at 1507 feet.

Shelby County: P. D. Lynch's Amling 1, NE NE NW 20-12n-2e, a wildcat near the village of Tower Hill, abandoned at 1679 feet.

Marion County: West of the village of Alma, The Texas Company is drilling below 2390 feet at Carlisle 1, SE NE SW 9-3n-3e, a wildcat test.

Clay County: Gulf Refining Company was shut down at Wortham 2, SE SE NW, west of Flora in semi-wildcat territory, awaiting orders.

East Texas

Van Zandt Well Has Small Show in Rodessa

The Van Zandt County wildcat of The Texas Company on the Easley 130-acre tract, N. T. Bickerson survey, 3½ miles south by east of Jackson, was drilling at 8295 feet in water sand to explore the Pettit after passing up a small show of oil in Rodessa. Drill-stem test at 8211-35 feet yielded 19½ stands of water cushion that was cut with oil and 4½ stands of rotary fluid with evidence of salt water. Humble Oil & Refining Company's Surratt 1, Edgewood area, was drilling shaley-lime at 8235 feet, having no shows in the Rodessa to this level.

Smith County: Bobby Manziel et al's Morrison 1, Friendship area, was awaiting orders after testing salt water following acid treatment of Pettit zone through perforations at 8036-58 feet and 7920-40 feet. Phillips Petroleum Company's McMinn 1, 6 miles south by west of Tyler, was drilling out cement to perforate favorable porosity logged in the Rodessa section in drilling to 10,011 feet. The company installed tankage and high-pressure separator to be prepared for a producer. This wildcat has been idle for several months, after landing pipe on bottom, because of title ducing areas.

Cherokee County: Humble Oil & Refining Company's Stephens 1-B, ¾-mile northwest of its Larissa pool discovery, was drilling shaley-lime at 11,060 feet, and checking more than 500 feet low. This confirmation test is a prospective producer despite its low structural position, as drill-stem test at 10,819-10,865 feet returned 45 feet of gas-cut mud with a small amount of green oil. Bottom-hole pressure was calculated at 2760 pounds. William H. Foster and associates have derrick up for the drill-of Bowlin 1, Wade H. Walters survey, ¾-mile northwest of the Lone Star pool, and will drill to 8200 feet, or water in the Travis Peak. This is the first deep test for the faulted Woodbine producing area.

Wood County: Magnolia Petroleum Company's McGee 1, wildcat on a southwest strike from the Coke field, showed water in Paluxy at 6438-43 feet, and was drilling at 6650 feet, Shell Oil Company's McIntosh 1, southwest edge of the Quitman field was abandoned at 6558 feet with top of Paluxy called at 6137 feet.

North Texas

New Deep Oil Field In Western Young County

Burk Royalty Company uncovered a new deep field in western Young County, 4½ miles west of New Castle, when Stovall 1, NWc TE&L 495, flowed 20 barrels of oil hourly on preliminary test from Marble Falls sand at 4352-70 feet. The company is starting a south offset. Standard Oil Company of Texas and Hanlon-Buchanan, Inc. own acreage immediately east of the discovery tract.

Wilbarger County: Johnny Fidel et al's Shelly 1, H&TC 46, block 13, a mile east of the Harrold pool, cemented pipe at 5507 feet to try for completion in broken conglomerate and sandy-lime zones at 5495-5500 feet and 5565-70 feet, after drilling to 5593 feet. Top of Mississippian was called at 5410 feet.

Clay County: Continental Oil Company and W. B. Omohundro's Crockett 1, Buffalo Springs prospect, 4¼ miles south by west of the Wynn pool, nearest production, set pipe with hole bottomed at 6816 feet in Ellenburger, topped at 6632 feet. This wildcat failed to encounter the Mississippian which is productive in the area, but logged favorable porosity and saturation in Simpson, topped at 6483 feet. Drill-stem tests at 6489-6523 feet and at 6489-6558 feet returned sufficient oil and gas to assure a producer.

Montague County: J. A. Chapman and Ed. McFarlin's Dodson 5 established new and shallower oil pay for the Dodson field, immediately east of Nocona, with pumping potential of 157 barrels of 41-gravity oil from Strawn perforations at 2808-18 feet, having plugged back from a small well in the 4500-foot Strawn pay. Phillips Petroleum Company's Whaley 1, structurally low and an east outpost, was idle for rig repairs at 6543 feet in Ellenburger, topped at 5610 feet, and may be carried to the Cambrian, or granite. Maguire Industries et al's Whaley 2, south offset to their recent prolific northeast extension, abandoned in Ellenburger at 5461-67 feet, while Magnolia Petroleum Company's Black 1, north offset to the outpost producer, landed pipe at 5342 feet after proving dry in Ellenburger at 5470-5559 feet, and will try for production in the 5200-foot conglomerate. S. D. Johnson et al's Reynolds 1, west offset to the later, flowed 60, 80 and 119 barrels natural the first 3 hours through ½-inch from Bend conglomerate at 5203-13 feet.

Cooke County: Northern Ordnance's Bell 1, S. W. McKneely Survey and offset to 4300-foot Strawn pumpers in the Woodbine field, established a shallower pay in pumping 216 barrels of 26.7-gravity oil and 5 barrels of water initial from perforations at 4112-37 feet. The company has 7 pumpers and 5 failures in the pool, and 4 additional outlying failures. Construction work is underway on its field gathering system, and tank car loading rack.

West Texas

North Monahans Pool in Winkler County Extended

One-mile east extension for the North Monahans one-well pool, Winkler County, was virtually assured when Stanolind Oil & Gas Company's Sealy-Smith 2, C SW SW Section 31, Block A, yielded oil- and gas-cut mud on drill-stem test at 6178-6232 feet, and was drilling broken Clear Fork pay at 6294 feet. This outpost occupies favorable structural position, having logged top of Yates at 2550 feet and San Andres at 3860 feet with elevation of 2812 feet. However, the pay section is subnormal to the discovery, which flowed 298 barrels of 37.5-gravity oil, with gas-oil ratio of 2998/1, through ⅛-inch choke from perforations at 6170-6248 feet. The company's Sealy-Smith 4, west offset to the discovery, was drilling broken pay at 6012 feet, having yielded 90 feet of slightlly gas-cut mud on drill-stem test at 5833-77 feet. The latter entered San Andres at 3760 feet with elevation of

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2772 feet. Permits have been applied for by the company to drill Sealy-Smith 7, 8 and 9, involving substantial outposts to the west, south and east. The Texas Company and DeKalb Agricultural Association have tests underway on the north edge of the 31,770-acre discovery lease.

Prospects: Shell Oil Company's Tankersley 1, GC&SF 12, Irion County, was due to start production test with 5½-inch cemented at 8084 feet and the hole bottomed at 8357 feet in Cambrian (Hickory) sand, topped at 8305 feet. This wildcat entered Ellenburger at 7360 feet. No information has been released on the extent of production shows revealed by electrical formation survey. In Lamb County and overlying buried granite mountains, Humble Oil & Refining Company's Jackson 1, R. M. Thomson Section 119, Block A, entered broken oil saturation at 5304 feet, and was coring at 5510 feet. Several drill-stem tests yielded small amounts of oil-cut mud and no gas. This wildcat is 7 miles northwest of Smith-Griggs Oil Company's Griggs 1, recently abandoned at 6502 feet in Glorietta, topped at 4880 feet. Humble Oil & Refining Company's Williams 1, Pecos County, 7½ miles northwest of Fort Stockton, is due to make additional casing perforations after showing a small volume of oil and gas at 2840-80 feet. In Garza County, Honolulu Oil Corporation and Devonian Oil Company's Dayton 1, 12½ miles northeast of Post area, nearest production, was awaiting production test after plugging back from 3768 to 3573 feet. A small pumper is in prospect.

Discoveries: Stanolind Oil & Gas Company's Midland Farms Company 1-F, Andrews County, 6½ miles northeast of the North Cowden field, nearest production, pumped and flowed 548 barrels of 31.6-gravity oil and 41 barrels of water, gas-oil ratio 160/1, on official test. No acid or nitro was used. Production is from Grayburg lime at 4825-80 feet, having plugged off water at 4939-42 feet. The company's second test for area was drilling at 4681 feet. In Shafter Lake area, Andrews County, The Texas Company's Jones 1, 1¼ miles north of a wildcat pumper, will make a small producer, having filled 4000 feet with fluid in cleaning out shot cavings to 4320 feet, then swabbed 140 barrels of fluid in 5 hours, averaging 70 percent oil. Broken pay was shot with 1500 quarts of nitro at 4370-4488 feet. Phillips Petroleum Company and Sunray Oil Company's University 1-H, Andrews County wildcat, 2½ miles northeast of production, will likely make a pumper, having averaged 20 to 25 barrels of oil daily on swabbing test after using mud acid in broken pay at 4615-4717 feet. A nitro shot is pending. Owners set 8⅝-inch pipe at 4553 feet to be prepared to deepen to the Glorietta, or 6000 feet.

Midland County: Standard Oil Company of Texas has acquired a 16-section block out of the A. Fasken acreage, centering 13 miles east of Midland, paying a bonus of $6.50 per acre cash and $75 per acre out of production. The block includes an old 4340-foot failure, which was not a decisive test for the Upper Permian.

Deep Failures: Coltex Refining Company's Miller 1, first Ordovician test for the Westbrook field, Mitchell County, recovered water in Ellenburger section at 7972-8200 feet. In Winkler County, Sinclair Prairie Oil Company's Campbell 1 filled with 900 feet of mud and 10,478 feet of salt water on 2-hour drill-stem test of open hole at 12,230-12,305 feet in Ellenburger, topped at 12,045 feet. Cement plug was set to perforate several upper zones. This prospect is among several that cost in excess of $400,000 to drill. Magnolia Petroleum Company's Butler 1, Crane County, yielded 5200 feet of sulphur water from Ellenburger at 5954-6185 feet.

Keystone: Amon Carter and Pure Oil Company's Walton 5-C, northeast edge of Ellenburger production, entered Ellenburger at 9440 feet, or 116 feet low to the west offset producer, and was drilling at 9605 feet in oil pay, topped at 9535 feet. Top of oil zone is about level with nearest producers, indicating a marked thinning of the gas-cap. Sinclair Prairie Oil Company's Walton 5-A, ¼-mile west of deep production, cemented 9⅝-inch at 4950 feet to exclude the Holt oil zone. Sun Oil Company's Keystone 2, 2 miles north by west of Ellenburger production, was drilling at 7850 feet, having logged base of Permian at 7630 feet, or 355 feet low. The Falcon Company's McCutcheon-Humble 5, 1½ miles southeast of nearest Holt pay wells, flowed 275 barrels of fluid, averaging from 10 to 20 percent bs&w, on natural test through ⅜-inch from perforations at 4740-45 feet. The performance of this outpost raises possibilities of a large Holt-pay area.

Southwest Texas

New Gas Field Is Opened Northwest of Crystal City

Edwin M. Jones has made location for Harry Ezzell C-4, in the recently-discovered San Caja Field, southwest of Ezzell field in McMullen County, 2723 feet southwest of Ezell C-2 discovery well. Meanwhile, PAW has designated the San Caja field as a "restricted area," limiting drilling in the field to 5 wells, including those drilling and producible. Later evidence will be examined to determine whether or not restrictions will be relaxed.

Zavala County: The Texas Company's Wm. Van Cleve 1, has opened a new gas field 12½ miles northwest of Crystal City. Perforations were made at 1960-65 feet, total depth 2538 feet, and the discovery flowed estimated 720,000 feet of gas daily through 5/16-inch choke with tubing pressure 510 pounds flowing and 840 pounds shut in. Location has been made for Van Cleve 2, Section 597, 5700 feet to the northwest.

Karnes County: Phillips Petroleum Company has extended production southwest in Hondo Creek field with completion of C. L. V. Reasoner-Pettus 1, flowing 156.85 barrels of oil daily through 5/32-inch choke from perforations at 6574-80 feet. Total depth is 6868 feet with top of the sand 6575 feet.

Brooks County: Humble Oil & Refining Company has extended production 1320 feet northward in the Scott & Hopper field with completion of Scott & Hopper 4, which flowed 81.29 barrels of oil in 24 hours through 7/64-inch choke through perforations at 6521-25 feet in the discovery sand. This well also had showings at 6193 feet in the upper sand established by the first well. Sun Oil Company's J. D. Cage 6 wildcat is in TM Railway Survey 665 on the company's 23,000-acre block north of the Scott & Hopper field. Location is 3½ miles north of Humble's production and 8050 feet northwest of Sun's Cage 5, abandoned recently at total depth of 7946 feet. The Texas Company's Mary M. Lasater 1, 4½ miles southeast of Falfurrias on a 2600-acre lease in the "Loma Blanca" grant, may be drilled below 10,000 feet.

Duval County: Duval Gasoline Company is asking permit from the Railroad Commission to operate a recycling plant in the Southland field, processing 10,000,000 feet of gas daily, trucking the product to Corpus Christi and returning gas to the Pettus and Teddie sands from which it is to be produced. There would be one withdrawal and one injection well for each sand. A wildcat is to be drilled by J. W. Gorman on the Herbst lease 6 miles east of Freer, another by Hewitt & Dougherty northwest of the Fitzsimmons field, and John T. O'Neil is making location for Clara Driscoll 1, 8 miles northwest of Benavides.

Edwards County: Shell Oil Company, Inc. is preparing to drill Elsie Honeycutt et al 1, Section 7, TCRR Survey, a 7500-foot rotary test 13 miles northwest of Rock Springs.

Duval County Operators Request 10-Acre Spacing

Harvey and Henderson have asked the Texas Railroad Commission for 10-acre spacing, wells to be located 330 feet from lease lines and 660 feet apart, in the area around their discovery well, Welder 1, Section 102, Samuel Alexander Survey, Duval County, southwest of the Seven Sisters field. Information obtained from nearby dry holes indicates the producing area will be long but only one to two locations wide, with definite faulting along the northwest side of the field.

Magnolia Petroleum Company has set casing on the southwest offset which also found seven feet of oil sand. Humble Oil & Refining Company is the only other leaseholder in the immediate area and Humble Pipe Line Company has agreed to run the oil.

Wilcox Sand Production In North Colorado County

Wilcox sand production has been discovered in northern Colorado County area with completion of Sinclair-Prairie Oil Company's A. J. Thompson 1, 3 miles southeast of the town of Frelsburg. This well which has been making tests during the past several weeks is a dual completion in two Wilcox sands through perforations at 9288-98 feet and at 8177-82 feet. Potential test from lower perforations showed 59 barrels of 59-gravity condensate daily through ¼-inch choke with tubing pressure 700 pounds and gas-oil ratio 12,458-1. From upper perforations it flowed 73 barrels of 54.8-gravity condensate in 24 hours through ¼-inch choke with casing pressure 2090 pounds and ratio 41,781-1.

Sinclair-Prairie is moving in rig for W. H. Kollmann 1, 2 miles northwest of the discovery, in the Peter Piper survey a mile southeast of Frelsburg. The company recently abandoned Glass-

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cock 1, wildcat 6 miles north of Rock Island, after making tests in the Wilcox section from 9235 on down to 9765 feet. Test on lower set of perforations recovered a slight show of gas. Others showed salt water. Total depth was 11,015 feet.

Shell Oil Company has not yet run potential test in Hill State Bank 1, which opens a new producing area northeast of the Sheridan Field and southwest of Rock Island. On preliminary tests it flowed 208 barrels of 58.2-gravity condensate daily through 19/64-inch choke from perforations at 9340-80 feet.

Superior Oil Company has started building roads to Matilda Tait 1 wildcat in central Colorado County, scheduled to 13,500 feet in testing Wilcox.

Galveston County: Glenn McCarthy's Maco Stewart 1, deep Hitchcock Field test, was squeezing off perforations around 12,350 feet and was scheduled to perforate higher for another drill-stem test, after recovering salt water on the first test. Total depth is 12,585 feet with 5½-inch casing set at 12,581 feet.

Pan American Production Company has erected derrick for its Danforth Community 1, lot 15, John Sellers survey, on the west edge of the Gillock Field, scheduled to drill to 8300 feet for a test of regular pay.

Chambers County: Standard Oil Company of Texas has completed State-Galveston Bay 3-109, northeast outpost to the Smith Point field as a gas well in a new sand. Before being shut in the flow was estimated at 16,000,000 feet daily, shut-in tubing pressure being 3400 pounds. Perforations were made in an intermediate sand at 9440-65 feet after testing failed to result in completion in a sand below 9700 feet that carried oil, gas, and salt water. Operators were never successful in getting the water shut off. This new gas sand is 1300 feet below the regular oil pay. Humble Oil & Refining Company spudded Mayes 2, wildcat on Smith Point east of the field, and was drilling in shale below 3050 feet.

Matagorda County: Tide Water Associated Oil Company has completed Harding 1, proving up new acreage on the west side of the Old Ocean field, flowing 39.8-gravity oil at the rate of 99 barrels daily through ¼-inch choke at top and 9/64-inch choke at bottom with tubing pressure 1050 pounds and ratio 10,414-1. Casing was perforated in regular sand at 10,069-071 feet. Sun Oil Company is preparing to start operations on Braman-Crier 1, wildcat in the John Crier survey north of North Markham Field.

South Louisiana

College Point Prospect Discovery Now Assured

Following a series of tests, three favorable, a discovery on the College Point prospect in St. James Parish is now assured. Humble Oil & Refining Company's Rosa Roussel Keller 1, 31-12s-4e, completed through perforations at 10,758-765 feet, during the nearly 24-hour final test, flowed at the rate of 8.56 barrels of 46.5-gravity oil per hour through ¼-inch positive choke with tubing pressure 5000 pounds flowing and 5350 pounds shut-in. Following original test when it flowed 4 barrels hourly, this well tested salt water from 10,295-301 feet, and then perforated at 10,770-772 feet for a test during which it recovered 8½ barrels hourly. These holes were squeezed off and final completion made at 10,758-765 feet.

Acadia Parish: Sun Oil Company's C. J. Freeland 1, which may extend production in the Egan Field 1½ miles northeast, is preparing to test after drilling to total depth of 10,796 feet. Casing had previously been set to 10,525 feet, and liner has been set below casing to 10,740 feet. Tests probably will be made in open hole below the liner before perforating for tests in the upper part of the discovery pay section.

Continental Oil Company's Fusilier 1 is extending production on the north edge of North Richie field, flowing 90 barrels daily through 8/64-inch choke, total depth 8638 feet, casing perforated in sand at 8580-8617 feet. In the North Tepetate Area, Humble Oil & Refining Company's M. L. Vincent, Jr. 1 was perforated at 7847-50 feet and completed flowing 273 barrels of 36.9-gravity oil daily through ⅛-inch choke with tubing pressure 1600 pounds, total depth 10,368 feet. Casing was set at 9600 feet, but no showings of commercial value were found in the lower part of the hole.

Cameron Parish: Superior Oil Company will deepen its Miami Corporation B-1 in the Pecan Lake field from old total depth of 10.883 to 12,500 feet. This well, original discovery for the field, was completed in May 1941, and still producing gas and condensate, is being deepened to explore sands below the discovery horizon at 10,174-184 feet. Recently the company abandoned Miami Corporation B-4, a mile north which had some nice sand bodies just above total depth of 12,480 feet, but which had been drilled across a fault between it and the discovery. These sands may come in high enough in the discovery well to produce. Southeast in the parish, Humble Oil & Refining Company's Rockefeller Preserve 1 is drilling below 7765 feet in shale with sand streaks.

Evangeline Parish: Gulf Refining Company's Schlicher-Thomas A-8 may establish production on the south flank of Pine Prairie Dome in the Sparta-Wilcox section. It has failed to show favorably on tests of deeper sands, but is making another drill stem test now with casing perforated at 9595-9504 feet.

Louisiana July Order Lowers Output from June

July oil allowables in Louisiana were set by the State Conservation Department at 389,224 barrels daily, a decrease of 5856 barrels from the June allowable of 395,080 barrels.

The new allowables by districts were: Houma, 61,516; Lafayette 105,700; Lake Charles 68,128; New Orleans 77,392; Monroe 31,596, and Shreveport 44,892 barrels.

Allowables for larger fields included: Eola 9000; Erath 16,774; Golden Meadows 8751; Jennings 9235; Iowa 9082; Lafitte 12,733; Paradis 9938; Quarantine Bay 8490; Venice 8842; Ville Platte 10,567; Haynesville 8000; Nebo-Hemphill 10919; Olla 9972; Rodessa 10,023 barrels.

BASIL B. ZAVOICO, consulting petroleum geologist and engineer, announces the opening of offices June 1 at 220 East 42nd Street, New York City.

North Louisiana

New Zone Is Discovered In Cotton Valley Field

Cotton Valley Operators Committee's Gray 1, 26-21-10, Cotton Valley field, Webster Parish, is flowing 15,000,000 feet of gas daily, with 150 barrels of 70-gravity distillate, from 10,681-86 feet. This is the deepest producing well in Northwest Louisiana, and opens a new zone in the heart of a field which has produced for a number of years from strata at 8000 to 9000 ft. It is expected to bring renewed drilling to test the new producing zone and others which had shows below the previous levels.

Lincoln Parish: Arkansas-Louisiana Gas Company's J. C. Dowling 1, 30-19-2, has been completed for a 15,000,000-foot gas well, and is closed in for connections. This is the second gas discovery for this company in Lincoln Parish in the last few months. Total depth is 6070 feet, producing from Travis Peak perforations between 5190-5200 feet. Casing pressure is 2100 pounds and tubing pressure is 1700 pounds.

Bossier Parish: Bellevue Producing Company's M. Moorey 2, SE SE 22-19-11, Bellevue shallow field, where production is from 350 to 450 feet, cored 100 feet of saturated oolithic lime in the Rodessa series of the lower Glen Rose formation, and set 5½-inch casing to 1975 feet. Perforations will be made between 1756-84 feet, in the top of the lime. Operators are recompleting M. Moorey 1, brought in last December for a 200-barrel well, but closed in waiting for connections.

Arkansas

New Distillate Production Discovered in Union County

Carter Oil Company's C. F. Wilson 1, C SW NW 33-16-18, just outside the Mt. Holly townsite and 2 miles north of the Mt. Holly oil pool in Union County, is flowing 3,600,000 cubic feet of gas daily, with 240 barrels white distillate, from Smackover lime at 6985-98 feet, with hole bottomed at 7090 feet. Operators have made application to the Arkansas Oil and Gas Commission to test the well over a 15-day period. The new gas-distillate pool will be named the Salem Church field, and field regulations will be discussed at the statewide hearing of the commission at El-Dorado July 20.

About 1½ miles north of the discovery, Northern Ordnance's J. B. Wells 1, 25-17-19, was at 7197 feet and preparing to core. Log of this test is said to indicate a different structure from the new discovery.

Columbia County: Magnolia Petroleum Company's R. Rogers 1, NW NW SE 14-17-19, which indicated a ½-mile east extension to Village field when it flowed 164 barrels of oil and 185 barrels salt water from 7367 feet, is being plugged back to shut off water. Crescent Drilling Company's Cooley 1, C NW SE 5-17-20, is making drill-stem test at 7687 feet in Smackover lime which was topped at 7632 feet. Cores taken at 7636-60 feet carried a strong gas odor and cores at 7672-87 feet carried asphalt stain.

Mississippi

Gulf's Latest Producer Somewhat Disappointing

Gulf Refining Company's John Morgan 1, SW SW 35-1-12, completed as a two mile extension of the Heidelberg field, Jasper County, has proven somewhat disappointing, with a flow of only 204 barrels in 24 hours through open tubing and indicating a pump installation in the near future. The company has made four offset locations.

In the Eucutta field, Wayne County, Gulf Refining Company has two wells going, one just under surface casing and the other rigged, and last week announced 8 locations.

S. W. Richardson's C. E. Berry 1, C SE NW 24-9-19, Jeff Davis County wildcat, gave a good gas-distillate show from cores between 7803-28 feet, but is drilling at 8162 feet. Tops reported were Wilcox 2797 feet, Midway 5935 feet, Clayton 6670 feet, Selma 6710 feet, and Eutaw 7480 feet. A 535-40 foot fault was found around 7400 feet and top of Eutaw was 515 feet higher than in Richardson's Maggie Bell 1, 15-9-19.

Humble Oil & Refining Company's Ida Stowers 1, 9-8-2, Adams County, was drilling below 7400 in Midway. Placid Oil Company's H. H. Crosby 1, 33-7-1, Franklin County, is below 9348 feet. Gulf Refining Company's Masonite C-1, 15-9-10, Jones County, is drilling below 5590 feet, after topping Eutaw at 5377 feet. Angle & Angle's Masonite 1, 31-3-11, Jasper County, was drilling at 4860 feet in chalk. Gulf Refining Company's A. J. Roberts 1, 23-2-5, Simpson County, was drilling below 6515 feet, after topping chalk at 5860 feet.

Georgia

Early County Wildcat Tests Being Continued

Mont Warren and Ray Robinson are continuing tests at Chandler 1, land lot 506, 26th land district, Early County, with hole bottomed at 7523 feet.

Hunt Oil Company's Musgrove 2, land lot 485, 12th land district, Clinch County wildcat, is drilling below 3175 feet. Stanolind Oil & Gas Company's Pullen 1, land lot 133, 10th land district, Mitchell County, is drilling below 3000 feet. The state's fourth wildcat, R. Kamob's Dean 1, land lot 127, 3rd land district, Wayne County, is reported rigged up and ready to spud.

Alabama

Hunt Oil Company Gets Pumper in Choctaw Field

Alabama's newest wildcat, H. L. Hunt's Robert T. Land 2, C SW NE 36-11-5, Choctaw County, is drilling below 3100 feet. In the Choctaw field Hunt Oil Company's Jackson 2 has been completed as a pumper making 50 barrels daily. Hunt's J. T. Doggett 1, C SE NW 2-10-4, recently completed, is undergoing a workover to shut out water. The well is perforated from 3562-69 with hole bottomed at 5069 feet.

Escambia County: Humble Oil & Re-

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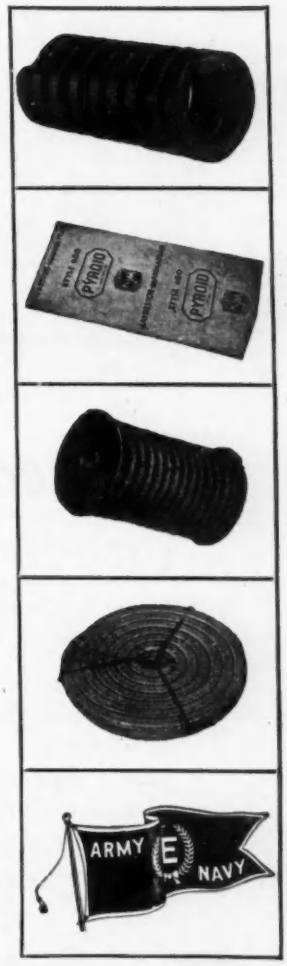

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fining Company's Skinner 1, C SE NW 10-3-10, failed to show oil indications on electric test, and is coring below 4500 feet.

Lamar County: Stanolind Oil & Gas Company's Jack Woods 1-A, 23-14-15, is being reamed to reset 15½-inch casing at 1157 feet.

Washington County: Humble Oil & Refining Company's Williams 1, C SE SW 16-6-4, is drilling below 7600 feet; The Texas Company's Odom 1, C SE SE 27-4-3, is drilling below 1200, after setting 10-inch at 1090 feet.

☆

JOHN THOMPSON, geologist for Amerada Petroleum Corporation, has been transferred from Houston to Jackson, Mississippi, where the company is opening an office.

Florida

Humble Well Coring After Passing Up Show in Lime

Humble Oil & Refining Company's Gulf Coast Realty 2, C SW SE 30-48-30, Collier County, the state's deepest wildcat, is coring below 12,300 feet in anhydrite with streaks of salt. Operators passed up a show in lime saturated with heavy black oil between 11,623-39 feet. Cores between 11,978-12,004 recovered salt.

Dade County: W. G. Blanchard's Everglades 1, SW SW 31-53-35, is shut down at 9000 feet for repairs, after coring between 8900-9000 feet. Blanchard's Grossman 1, NE SW 25-55-37, is driving 12½-inch casing at 370 feet in quicksand. Humble Oil & Refining Company's State 1, C NE NW 30-55-36, is drilling below 1750 feet.

Highlands County: Derrick has been erected at Humble Oil & Refining Company's Carlton 1, C SW NE 34-38-29, the county's first wildcat.

Two other wildcats, Consumers Oil & Fuel Company's State 1, C NW 24-45-35, Dade County, and C. L. Arter's National Turpentine & Pulp Company 1, C SW NE 11-8-9, Alachua County, are reported moving in materials.

California

New Field Reported Near Premier in Kern County

Opening a new field 1 mile east of Premier and 2 miles northwest of Kern Front, Kern County, Independent Exploration Company's Conoco 33, SE NW NW 33-27-27, made an initial flow of approximately 125 barrels a day of clean, 13-gravity oil, from a 69-foot section of sand bottomed at 2345 feet. Etchegoin production of Pliocene age is derived from a zone not exploited in any of the several adjacent fields. The discovery is on acreage leased from Continental Oil Company, a tract of 320 acres, and other than an additional half-section, all remaining ground considered in the play is held by Tide Water Associated Oil Company.

A showing of promise was the coring of oil sand at 11,000 feet in General Petroleum Corporation's Buena Park, Orange County, wildcat. Eleven wildcat tests in the state were abandoned, including Richfield Oil Corporation's 10,235-foot test west of Rio Bravo, and Standard Oil Company's Wegis Unit 2 in Greeley area, which went to 11,476 feet.

New wildcat starts dropped to 4, the lowest level of the year, and none in any area with recognized great possibilities.

Fresno County: The Texas Company's East Coalinga area deep test in Section 21-19-16, which had some promising indications, proved wet in all of a series of formation tests and will be abandoned at 10,558 feet.

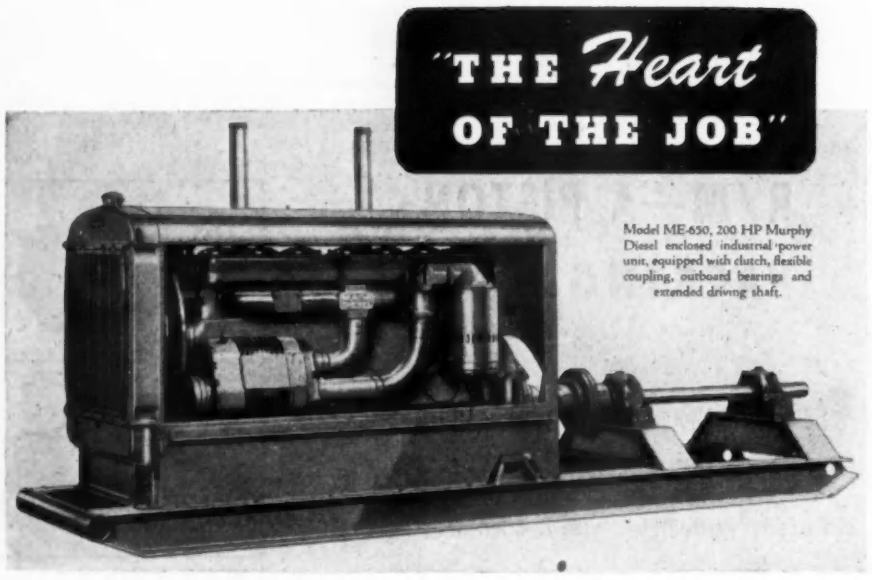
Kern County: Bandini Petroleum Corporation's wildcat west of North Belridge, scheduled to go to 11,000 feet, at 5225 feet encountered dips as great as 42 degrees, raising doubts as to whether it is favorably located.

Tide Water Associated Oil Company's Gosford area wildcat on test at 7920 to 8006 feet, open 40 minutes, made a strong blow of gas with fluid to within four stands of the surface, but with the 3 2/3 stands of gassy oil, 2 2/3 stands of salt water were recovered. The well is being cored ahead at 8089 feet.

Los Angeles County: Seaboard Oil Company's Elysian Park wildcat, in the heart of Los Angeles, went into basement material at 1500 feet, even before the whipstocked well had reached a point within the park lease boundaries. It is being drilled through slate to reach such a point and thus fulfill drilling obligations, prior to abandonment.

A deep test on the Baldwin property in Montebello field is planned by Standard Oil Company. In the same field, Union Oil Company's deep test, has a fishing job at 10,690 feet, after coring oil sand.

Orange County: General Petroleum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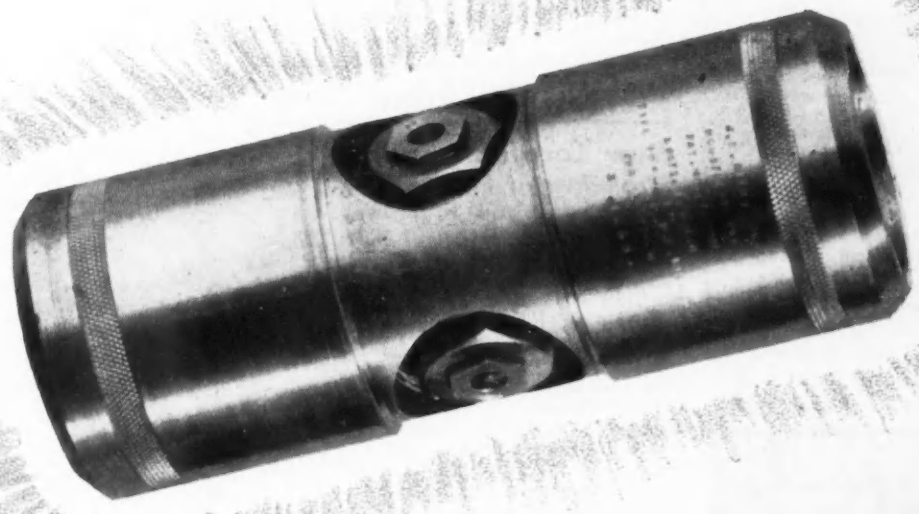

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THORNHILL-CRAVER COMPANY
HOUSTON

Corporation's Buena Park wildcat, cored well saturated oil sand between 10,985 feet and bottom at 11,025 feet, apparently Repetto, equivalent of formation just below the Meyer zone at Santa Fe Springs.

Michigan

New Locations Follow Showing of Free Oil

George Steven's Crank 1, SW NE NW 15-30n-3e, Montmorency County wildcat, probably will be deepened. Production tests to a pay in the Monroe at 2165 feet showed only a small amount of free oil. First wildcat in the county to carry free oil, this outpost has brought three locations in the immediate area and caused heavy lease plays in the district.

Bay County: Gulf Refining Company started to core at 7245 feet in Salina 1, SE SE SE 34-15n-4e, Kwakalin field deep gas test, with a schedule of alternate coring and drilling to probably 7800 feet. It is the first test in field to penetrate the Salina section since completion of Bateson 1, Section 2-14n-4e, in 1941, at a plug-back depth of 7850 feet for 7,000,000 feet gas in Salina section.

Rocky Mountain Area

East Lance Creek Gets State's Latest Oil Pool

A new oil pool was opened in Wyoming in Continental Oil Company's Wright 1, NW SW NW 25-36n-64w, on the East Lance Creek structure in Niobrara County. The new producer flowed 184 barrels of 42.3-gravity oil from Lower Dakota sand at 3847-3867 feet, producing through 29 perforations in the 7-inch casing. It is 3½ miles east of the nearest producer, and 6 miles east of the Lance Creek field. Hole was drilled to 4100 feet and found the Lower Lakota at 4028-4072 feet water-bearing. Continental Oil Company controls 1560 acres on the structure and is operator of the area, which is unitized.

Crooks Gap: Sinclair Wyoming Oil Company is moving in material for State 1, NW SW NW 18-28n-92w, Tensleep test on the Crooks Gap structure, Fremont County, Wyoming, 8 miles northeast of Stanolind Oil & Gas Company's wildcat on the Poison Creek structure, now in the process of drilling with its objective the Tensleep. Crooks Gap is a small faulted elongated dome with steep dips and surface formation is Steele and Niobrara shale. Six wells have been drilled on the structure, one a small gasser in the Frontier, one 30 barrels of oil daily from the Wall Creek sand, two were drilled off structure and two were abandoned after failing to develop production in the Dakota. The lower horizons are untested.

E. G. DAHLGREN, technical secretary of the Interstate Oil Compact Commission, has been elected president of the Oklahoma City Geological Society, succeeding I. Curtis Hicks. Other officers chosen include T. G. Glass, Sinclair Prairie Oil Company, vice president, and C. E. Hamilton, Consolidated Gas Company, secretary-treasurer.

WESTERN CANADA

Denhart Dome Well Gets Promising Show of Oil

Princess-Steveville Syndicate's No. 1, lsd 7 14-20-11w4th, on the Denhart Dome, has encountered a promising oil showing in the Bow Island sand, a horizon which is a prolific gas producer in some sections of the Alberta Plains, but until this showing, was not seriously regarded as offering any great oil prospects.

It cored Bow Island at 2520 feet, and 47 feet in at 2567 feet. A 50-minute drill-stem test recovered 6 barrels of fluid, including 4 barrels of 25-gravity sweet oil, no formation water, and little gas. This test had been intended as Basal Colorado, Basal Cretaceous and Madison lime venture, but it has been decided casing will be set on top of Bow Island and swab.

The Alberta Petroleum Association has protested a move by the Provincial Department of Lands & Mines to offer reservations on Crown petroleum and gas rights for sale by auction on a 'royalty bonus' basis. In the past, such auctions have called for cash bonuses per acre, with royalty a straight 12½ percent or a sliding scale from 5 to 15 percent, based on daily average yield each month of production. The government has called for tenders on two blocks, 3440 acres in the Calling Valley area of the Foothills flanking Turner Valley to the east, and 9920 acres in the Skiff area, on the Southeast Alberta Plains.

Canadian Drilling Is Less Than Previous Month

Western Canada on June 1 had 46 wells drilling, compared with 48 a month previously. They included 3 in Saskatchewan and 43 in Alberta. While 22 wells were under way in Turner Valley field, about the same number were drilling in Alberta in other widely scattered areas, 1 well to an area except at Taber field where 3 were drilling and in the Conrad area where there were 2.

Wells Drilling in Western Canada on June 1, 1944

Field or Area	Dr.	S.D.	Dk.	Loc.	Total
Alberta:					
Turner Valley	22	..	..	5	27
Aldersyde	..	2	..	..	2
Athabaska	..	1	1	..	2
Armelgra	..	..	1	..	1
Bruderheim	..	1	..	..	1
Coalspur	1	..	..	..	1
Conrad	2	1	1	2	6
Del Bonita	1	..	..	..	1
Fabyan	1	..	..	..	1
Foremost	1	..	..	..	1
Innisfree	1	..	..	..	1
Jumping Pound	1	..	..	..	1
Kinsella	..	..	1	..	1
Legend	1	..	..	..	1
Lloydminster	1	..	..	..	1
Moose Dome	1	1	..	2	4
Nordegg	..	..	1	..	1
Pinhorn	1	..	..	..	1
Pouce Coupe	1	..	..	..	1
Purple Springs	1	..	..	..	1
Ram River	1	..	..	..	1
Pincher Creek	1	..	..	..	1
Princess	..	..	..	1	1
Taber	3	..	..	3	6
Twin River	1	..	..	..	1
Watson	1	..	..	..	1
Saskatchewan:					
Unity	1	..	..	..	1
Corinne	1	..	..	..	1
Central Butte	1	..	..	..	1
State or District Total	46	6	5	13	70

U. S. Exploratory Completions

ARKANSAS WILDCAT

Union County—Failure: Skelly Oil Co.'s L. O. McGough 1, 16-16-15, abnd 4204 ft.

CALIFORNIA WILDCATS

Colusa County—Failure: Union Oil Co.-General Pet. Corp.'s Azro 1, c nw se 10-16-1, Colusa area gas test, abnd 3018 ft.

Contra Costa County—Failure: Shell's Heidorn 1, sw ne ne 4-1-2, Neroly area gas test, abnd 4048 ft.

Kern County—Failures: E. R. Bardwell's 1, se sw sw 23-11-24, Maricopa area, abnd in brown shale 1100 ft.

Continental-Kern County Land Co.'s Oper. J-1, 17-30-27, Gosford area, abnd after minor showings 9303 ft.

Di Giorgio Fruit Co.'s 35-10, nw ne sw 10-31-29, traces oil, abnd 6186 ft.

H. H. Magee, Operator's Glide 7-11, Mount Poso area, poor Vedder 989 ft, Claystone, Walker 1308 ft, abnd 1367 ft.

Richfield Oil Corp.'s A-18-36, nw sw sw 36-11-19, Tejon Ranch, wet, abnd 2177 ft.

Richfield Oil Corp.'s KCL-Goosloo 1, sw nw ne 20-29-25, area west of Rio Bravo, abnd 10,235 ft.

Shell's Glide 1, sw se sw 13-26-27, Dyer Creek area, Vedder sand 2138 ft wet, abnd 2166 ft.

Standard of Cal.'s Wegis 2, ne ne nw 28-29-26, Greeley area, Stevens zone 7665 ft, Rio Bravo 11,476 ft, Vedder 11,510 ft, no oil sand, abnd 11,638 ft.

Tulare County—Failure: Barnsdall Oil Co.'s Lombardi-Security 1, sw sw se 16-23-26, Pixley area, no showings, basement 4181 ft, abnd 4223 ft.

COLORADO WILDCAT

La Plata County—Failure: Ashback & Locke's Krueger 1, cel sw ne 34-33n-12w, Red Mesa, abnd 3005 ft Mancos shale.

ILLINOIS WILDCATS

Champaign County—Failure: Ritchie's Richardson 1, nw sw se 35-21n-10e, abnd 1095 ft.

Clinton County—Failure: Lagers et al's Rudolph 1, se nw nw 32-3n-3w, abnd 1236 ft.

Effingham County—Failures: Luttrell et al's Groger 1, nw se sw 27-8n-6e, abnd 2572 ft.

Gulf's Deters 1, ne ne sw 27-9n-6e, abnd 2467 ft.

Hamilton County—Failure: Magnolia's Matheney 1, sw ne sw 19-15s-5e, abnd 3393 ft.

Hamilton County—Discovery: Natl. Assoc. Pet.'s Hicks et al 1, se nw nw 33-5s-7e, McCl 3364-67 ft, pump 80 bbls, td 3387 ft.

Montgomery County—Failure: Texas Co.'s Long 1, ne ne se 27-11n-5w, abnd 2525 ft.

Wabash County—Discovery: Central Pipe's Garst 1, ne ne sw 27-2s-13w, O'Hara 2713-21 ft, pump 173 bbls, td 2728 ft.

Wayne County—Discovery: Pure's Bonham 1, ne se nw 27-1n-8e, McCl 3063-77 ft, pump 158 bbls, td 3081 ft.

White County—Failure: Luley et al's Pittman 1, ne se nw 22-5s-10e, abnd 3188 ft.

INDIANA WILDCAT

Porter County—Failure: Tri-State's Egelske 1, sw sw ne 9-36n-5w, abnd 1116 ft.

KENTUCKY WILDCATS

Butler County—Failure: Miller et al's Anderson 1, 15-H-32, abnd 619 ft.

Daviess County—Failure: Hupp et al's Reno 1, 14-Q-27, abnd 1972 ft.

Henderson County—Failure: Woods et al's Fee 8, 1-Q-22, abnd 2303 ft.

NORTH LOUISIANA WILDCATS

Caddo Parish—Failure: O. R. Pennington's E. D. Williams 1, 3-15-15, abnd 5204 ft.

Catahoula Parish—Failure: Joe F. Belt's Mrs. A. A. Webb 1, 3-8-5, abnd 423 ft.

DeSoto Parish—Failure: H. C. McCalman's Williams 1, 6-10-12, abnd 1905 ft.

Lincoln Parish—Gas Discovery: Arkansas-Louisiana Gas Co.'s J. C. Dowling 1, 30-19-2, est 15,000,000 gas fr Travis Peak at 5190-5200 ft, td 6070 ft.

NORTH LOUISIANA NEW PAY TEST

Webster Parish—Cotton Valley Discovery: Cotton Valley Operators' Gray 1, 26-21-10, 15,000,000 gas, 150 bbls 70-gr dist fr 10,658-83 ft.

MICHIGAN WILDCATS

Kalamazoo County—Failure: Fisher-McCall Oil Co.'s Bishop B1, sw nw ne 5-2s-12w, Traverse lime, abnd 1392 ft.

Lake County—Failure: Sohio Petroleum Co.'s State A1, s½ sw se 28-17n-12w, Dundee 3305 ft, abnd 3575 ft.

MISSISSIPPI WILDCAT

Rankin County—Failure: Phillips' Denkmann 1, c se se 13-7-4, elev 388 ft, Cockfield 215 ft, Cook Mt. 520 ft, Sparta 634 ft, C. River 1124 ft, Talla 1298 ft, Wilcox 1567 ft, Midway 3800 ft, Clayton 4530 ft, Selma 4576 ft, Eutaw 5698 ft, Tuscaloosa 6217 ft, Marine Tusca 6880 ft, Massive 7118 ft, Lower Cret 7555 ft, abnd 12,005 ft.

MONTANA WILDCAT

Toole County—Discovery: Texas Co.'s Wagner 1, ne sw ne 20-36n-1w, Willshaw, pump 7½ bbls in 22 hrs fr Sunburst 1756-81 ft, td 2006 ft in wtr.

OKLAHOMA WILDCATS

Carter County—Failure: Pure's Pierson 1, nw ne se 6-3s-2e, abnd 10,017 ft.

Lincoln County—Failures: Flynn Oil's Kinsey 1, ne nw nw 22-12n-4e, Syl 5387 ft, 1st Wx 5437 ft, 2nd Wx 5478 ft, abnd 5557 ft.

Wilcox O&G Co.'s Sparks 1, se ne sw 21-13n-5e, Hunton 5031 ft, abnd 5190 ft.

Logan County—Failure: Trigg's Bennett 1, ne nw nw 8-17n-2w, abnd 3670 ft.

EAST TEXAS WILDCATS

Limestone County—Failure: J. G. Phillips and C. W. Killough's Oliver 1, 3300 ft fr swl 14,700 ft fr nwls Pedro Varella sur and on 100-ac, elev 565 ft, Austin 2612-3059 ft, Woodbine 3444 ft, cut fault 3920 ft, Buda 3652 ft, Paluxy 3724 ft, Pettit 5146 ft, Travis Peak 5270 ft, abnd 5363 ft.

Lamar County—Failure: Clark & Ogg's Smiley 1, 330 ft nsl 500 ft wel J. H. & R. B. McColley sur, elev 582 ft, Goodland 1830 ft, Paluxy 1860 ft, Glen Rose 2300 ft, Paleozoics 3260 ft, abnd 3355 ft.

EAST TEXAS BORDER WILDCATS

Panola County—Failures: Hunt Oil Co.'s Greer Est. 1, Jesse Smith sur, 3 mi w of DeBerry, abnd 6900 ft.

Southport Petroleum Corp.'s Scharnagel 1, Catherine Lindsey sur, near Clayton, abnd 6915 ft.

NORTH TEXAS WILDCATS

Archer County—Oil Discovery: Consolidated Oil Co.-Premier Oil Ref. Co.'s Mrs. B. Garrett 1, 330 ft out nwc of east 225 ac of John Walker sur A-676, elev 1020 ft, Bend 4603 ft, Miss 5400 ft, Ellen 5622 ft, flow 112 bbls 42-gravity, 18/64-in, natural, Strawn perforations 3780-3800 ft, td 5685 ft.

Archer County—Failures: D. H. Bolin et al's Abercrombie 1-D, 2769 ft nsl 1548 ft wel blk 152, Harris subdiv, abnd 1300 ft.

Henry Grace et al's Wilson 1, 900 ft snl 1250 ft ewl ATNCL sec 86, abnd 1641 ft.

Peery & Meredith Dr. Co.'s DeMoss 3, 950 ft ewl 600 ft snl sec 25, blk 5, Clark-Plumb sur, abnd 1178 ft.

Cooke County—Failures: Batson Oil Co.'s Zimmerman 1, 330 ft snl 800 ft wel of A. Van Slyke sur A-1076, Ellenburger 1506 ft, abnd 1567 ft.

Trumter Pet. Corp.'s Andress 1-A, 150 ft out of m/e/nw cor of J. Clark sur A-194, abnd 1079 ft.

Denton County—Failure: Northern Ordnance's Donald 1, 330 ft out of swc, Geo. M. Dial sur A-379, 3 mi e Pilot Point, Trinity series 930-2010 ft, Ellenburger 2460 ft, abnd 2618 ft.

Jack County—Failure: Shell's Carpenter 1, 467 ft snl 1050 ft ewl J. Cook sur A-153, elev 1003 ft, Bryson sand 3300 ft, Bend 4320 ft, Marble Falls 4979 ft, Barnett 5430 ft, Miss 5638 ft, Ellen 5708 ft, abnd 5848 ft.

Young County—Failure: Northern Ordnance's Boyd 1, 450 ft snl 567 ft ewl TE&L Co sec 1455, Bend 4350 ft, Miss 5096 ft, Ellen 5356 ft, abnd 5416 ft.

NORTH TEXAS NEW PAY TEST

Cooke County—Woodbine Upper Strawn Discovery: Northern Ordnance's J. H. Bell 1, 1200 ft wel 505 ft nsl of S. W. McKneely sur A-638, elev 735 ft, pump 225 bbls 27-gr, 4% wtr, Strawn perf 4117-27 ft, td 4704 ft.

TEXAS GULF COAST WILDCATS

Colorado County—Failure: Sinclair Prairie's C. G. Glassock 1, 2500 fr wl 1850 fr sl L. Henry sur A-339 310-ac tr, abnd 11,015 ft.

Harris County—Failure: Humble's Maud Hickman 1, 660 s&w of nec 159.72-ac lse or 660 fr n&el se¼ sect 81 blk 2 lot 2, abnd 7760 ft.

TEXAS GULF COAST OUTPOST

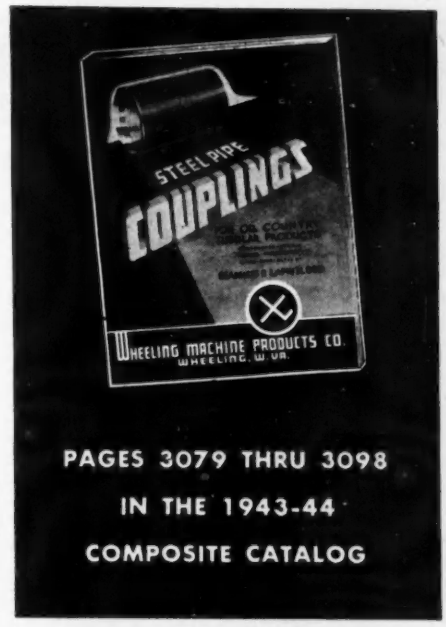
Chambers County—Seabreeze E. Extension: Sun's Thompson 1, 330 fr sl 528 fr el T&NO sur 133 on 40-ac unit 330 fr sl of unit, e of Seabreeze field, elev 10.6 ft, perf 100 shots 9450-75 ft, flow 769 bbls 53.1-gr cond, 20,500,-000 gas open, td 9929 ft.

TEXAS GULF COAST NEW PAY TEST

Liberty County—Hull Discovery: J. W. Mecom's Abshier et al 1, 266 fr wl 368 fr sl 9-ac unit, dual comp, sand 6940 ft, B sand 6810 ft, perf 6810-40 ft, flow 187 bbls 36.4-gr, ¼-in; perf 6940-70 ft, flow 531 bbls 36.7-gr, ¼-in, td 7108 ft.

LOWER TEXAS COAST WILDCATS

Goliad County—S. Cabeza Creek Discovery: Continental's S. H. Reed 1, 330 fr sl 3300 fr wl 546.9-ac lse in Sebastiano Vela sur A-337, 11,500 sse Cabeza Creek Wilcox discovery 2



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■ WANTED: A Petroleum Engineer with field experience, for engineering development work, with a large manufacturer of oil field equipment and materials. Permanent position with good future for right man. In replying state age, education, business background, salary desired, etc. Address: Box 38, c/o The Oil Weekly, Houston, Texas.

■ Engineer or Physicist to engage in study of reservoir performance as related to physical properties with major oil company. Individual should have aptitude and background to enable the mastering of mathematical analysis of problems in flow of fluids. Position offers good future. Give full personal data, experience and salary desired. Our employees know of this advertisement. All answers strictly confidential. Address: Box 65, c/o The Oil Weekly, Houston, Texas.

■ Chemical Engineer or Chemist to engage in research analytical work with major oil company. Would include some field, some laboratory work. Past experience in high vacuum technique preferred. Position offers good future. Give full personal data, experience and salary desired. Our employees know of this advertisement. All answers strictly confidential. Address: Box 64, c/o The Oil Weekly, Houston, Texas.

■ Research Geophysicist with several years experience preferably including field work and laboratory work, to engage in research geophysics with major oil company. In charge of work including evaluation of new ideas and experimental development of some. Position offers good future. Give full personal data, experience and salary desired. Our employees know of this advertisement. All answers strictly confidential. Address: Box 63, c/o The Oil Weekly, Houston, Texas.

■ MAN with geological or geophysical training and experience, wanted for foreign exploration and development work with large oil company. Give age, educational background, experience and marital status. Address: Box 62, c/o The Oil Weekly, Houston, Texas.

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SITUATIONS WANTED

■ TRANSPORTATION MAN, 43 years old, married, 17 years oil industry experience South America. Capable organizing and managing operations, garage, parts setup, etc. Foreign location preferred. Address: Box 57, c/o The Oil Weekly, Houston, Texas.

■ LAWYER: Above draft age, wants connection with independent oil company or individual operator; experienced in blocking acreage, examining and curing titles and trial of law suits. Can furnish best of references. Interview solicited. Address: Box 61, c/o The Oil Weekly, Houston, Texas.

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mi ese of old shallow Pettus disc, perf 8806-16 ft, flow 73 bbls, ¼-in, td 9019 ft.

Jackson County—Discoveries: Akron Prod. Co.'s Jos. Wearden 2, 454 fr nl 660 fr wl portion 900-ac lse in I&GN sur 2 blk 4 A-127, sand 4121 ft, perf 4826-36 ft, flow 2,000,000 gas, ¼-in, td 4828 ft.

Butcher-Arthur's Andrew Lorenzen 1, 660 fr ne&sel sect 1 C. W. Hahl subdvn of D. H. Burn rch, J. J. Linn sur A-213, on 80-ac lse, perf 5376-80 ft, 5820-30 ft, flow 600,000 gas, spray straw-colored cond, 1/16-in, td 6812 ft.

Roxie Wright's Henrietta Huseman 1, 330 fr swl sur 15 A-329, 330 fr nl 80.29-ac lse, E. Maurtitz area, perf 5662-68 ft, flow 52.44 bbls 30.6-gr, 3/32-in, td 5720 ft.

Jim Wells County—Failure: Bridewell Oil Co.'s E. A. Ranz 1, 660 fr wl 1980 fr sl 180-ac lse Haldeman subdvn Seeligson Rch sect 25, abnd 7298 ft.

Karnes County—Failures: Chas. E. Fraser's E. P. Ruhman 1, 660 fr sel 860 fr swl 300-ac tr 2400 fr nwl 6400 fr nel Willis Orton sur 135 A-221, abnd 4315 ft.

Sohio's Mrs. S. E. Radford 1, 330 fr swl 295.91-ac lse 3200 fr sel 2310 fr nel Moses Nichols sur A-321, Wilcox test, abnd 8031 ft.

San Patricio County—Failure: Great Lakes Carbon's C. A. Maedgen 1, 500 fr nel 660 fr swl 80-ac lse, M. P. & J. N. Delgado Gr A-4, abnd 5045 ft.

Victoria County—Mission Valley Discovery: Northern Ordnance's W. F. Heath 1, 660 fr swl 4575 fr sel Eben Haven sur A-58, perf 8402-07 ft, flow est 46,000,000 gas open tubing, 120 bbls 51.5-gr oil, 7/64-in, td 10,014 ft.

LOWER TEXAS COAST OUTPOST

Karnes County—Burnell Extension: Navarro Oil Co.'s Francis Gauntt 1, 467 fr nnel 467 fr swl 229.3-ac lse, J. Richardson & Carlos Martinez Gr, 6000 sw American Liberty's Von Roeder 1, 6000 ne Magnolia's Ingram 1, dual comp, upper sand perf 6648-63 ft, flow gas-cond, shut in; Wilcox 6778 ft, comp open hole, 147.66 bbls 35.5-gr, 9/64-in, td 6784 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Failures: M. M. Miller & Sons' Atlee Parr 1, 53,467 fr nl 467 fr el blk 53 and 40-ac lse 467 w of sec San Andres sur, abnd 5723 ft.

G. B. Parr's Jesus G. Ancira 1, 1944.5 fr n&el 513.51-ac lse, J. Poitevent sur, sect 185, abnd 4703 ft.

Jim Hogg County—Failure: Bridewell Oil Co.-Midstates Oil Co.'s Clara Yaeger 1, 330 fr nl 990 fr wl 80-ac tr, 4209 fr wl Nerecitas Gr on sect 11, Viggo Kohler subdvn, abnd 3981 ft.

WEST CENTRAL TEXAS WILDCAT

Shackelford County—Failure: Jack Story Jr. et al's Green 1, 1170 ft out nec sec 1, Bayland Orphan Asylum Lands, abnd 612 ft.

WEST TEXAS WILDCATS

Andrews County—Failure: Sinclair Prairie's Grisham-Hunter 1, c nw nw PSL 14, blk 73, elev 3242 ft, Yates 2960 ft, Permian 8265 ft, Mississippi 8590 ft, Montoya 10,180 ft, Simpson 10,455 ft, Ellenburger 11,191 ft, granite 11,320 ft, abnd 11,322 ft.

Crane County—Failure: Magnolia's Butler 1, 7260 ft fr nel 660 ft fr sel H&TC Ry. 6, blk 1, elev 2361 ft, anhydrite 360 ft, Yates 1220 ft, San Andres 2300 ft, Simpson 5310 ft, Ellenburger 5954 ft, abnd 6185 ft.

Gaines County—Failure: Gulf's Buck 1, c se nw W. T. Ry. 104, blk G, elev 3288 ft, anhydrite 2284 ft, Yates 3410 ft, brown lime 4440 ft, abnd 5502 ft.

Loving County—Failures: Standard of Texas' Johnson 1-4, c se se T&P Ry. 4, blk 56, Tsp. 1, elev 2960 ft, Delaware sand 3448 ft, abnd in wtr 3498-3598 ft.

Standrad of Texas' Johnson 1-46, c ne ne T&P Ry. 46, blk 54, Tsp. 1, elev 2961 ft, salt 1238 ft, Delaware lime 4425 ft, sand 4450 ft, abnd 4568 ft.

Pecos County—Failure: Standard of Texas' Mac-Der Co. 1, lse 3, c sw sw H&GN Ry. 64, blk 11, elev 3002 ft, Yates 1258 ft, grains 1270 ft, Wolfcamp 4974 ft, detrital 5258 ft, quartz sand 5300 ft, granite 5373 ft, abnd 5374½ ft.

Terry County—Failure: N. G. Penrose's Moore-Gulf 1, c nw nw D&W Ry. 82, blk T, elev 3339 ft, abnd 5571 ft.

WEST TEXAS NEW PAY TESTS

Andrews County—Deep Rock Failure: Humble's Carter 1, c se sw PSL 23, blk A-46, elev 3195 ft, brown lime 3890 ft, San Andres 4290 ft, Barnett shale 10,110 ft, Silurian 10,160 ft, Devonian 10,229 ft, abnd 11,812 ft.

Mitchell County—Westbrook Ordovician Failure: Coltex Ref. Co.'s Miller 1, 322 ft snl 2268 ft ewl T&P Ry. 22, blk 28, T-1-N, elev 2135 ft, lime 1523 ft, brown lime 4390 ft, chert 7865 ft, Ellenburger 7972 ft, abnd 8200 ft in sul water.

WYOMING WILDCAT

Niobrara County—Discovery: Continental's Wright 1, nw sw nw 25-36n-61w, East Lance Creek, flow 184 bbls 8 hrs 42.3-gr, fr lower Dakota 3847-3867 ft, td 4100 ft.

United States Wildcat Starts

ALABAMA

Choctaw County: H. L. Hunt's Robert 2. Land 2, c sw ne 36-11-5, dr 2926 ft.

ARKANSAS

Ouachita County: G. H. Vaughan's J. F. Haltom 1, ne ne se 28-15-18, dr.

Union County: Kerlyn Oil Co.'s Union Sawmill 1, 331 w from el 330 n fr sl 20-18-13, lcn.

Newton County: W. S. King's J. L. Shouse 1, 255 e 391 n fr swc sw ne 36-17-19, lcn.

Calhoun County: Durbin Bond's Stout Lbr. Co. 1, swc sw sw 34-14-14, lcn.

Little River County: W. S. King's E. A. Stubblefield 1, 440 e 450 s fr nwc ne ne 10-12-30, lcn.

Miller County: Carter Oil Co.'s J. R. Bodenhamer 1, c nw se 2-16-26, lcn.

Union County: J. Lee Youngblood & Foree's C. L. Smith Est. 1, c ne ne 30-17-14, lcn.

CALIFORNIA

Kern County: Bandini Pet. Corp.'s Bishop-Mills 7, sw ne se 24-28-28, Round Mountain area, mim.

Reserve Oil & Gas Co.'s 33-7, se se ne 33-11-19, Tejon Ranch area, mim.

Madera County: Texas Co.'s Gill 7-25, 1320 ft s 990 ft w nec 19-13-16, Gill Ranch gas test, lcn.

San Mateo County: Richfield Oil Corp's Lena Souza 1, sw sw ne 13-7-5, San Gregorio area, lcn.

ILLINOIS

Clay County: Pure's Smith A-1, sw se se 35-3n-8e, lcn.

Clinton County: Layer et al's Rudolph 1 (OWDD) lcn.

Wiser Oil et al's McAdams 1, sw nw sw 21-3n-1w, dr 587 ft.

Finley et al's Widekiniper 1, nw sw sw 33-3n-1w, dr 782 ft.

Effingham County: Magnolia's Rieman 1, se sw se 2-7n-6e, lcn.

Hamilton County: Nat'l Assoc.'s Little 1, nw nw sw 3-6s-7e, lcn.

Jefferson County: Texas Co.'s Kashan 1, se se nw 8-2s-1e, lcn.

White County: Kingwood Oil Co.'s Brockett 1, sw se ne 29-5s-9e, dr 663 ft.

INDIANA

Gibson County: Jackson's Hull 1, ne se sw 23-1s-11w, lcn.

Posey County: Redgrave's Graulich 1, se se ne 9-7s-13w, lcn.

KENTUCKY

Butler County: Brimm's Marsh 1, 10-I-34, dr 207 ft.

Crittenden County: Smith et al's Brantley 1, 22-L-19, lcn.

Henderson County: Woods et al's Fee 8, 1-Q-22, lcn.

NORTH LOUISIANA

DeSoto Parish: G. C. Schoonmaker's Sample 1, 990 s 1650 e nwc 12-13-14, lcn.

Franklin Parish: C. L. Smith Co.'s Bates Estate 1, 330 s 330 e fr nwc sw 18-12-8, lcn.

Union Parish: Interstate National's Fee 151, 1320 n 1320 w fr sec 24-22-3, lcn.

Interstate National's Fee 154, 1270 s 1370 w fr nec 25-22-3, lcn.

MICHIGAN

Bay County: Atha and Roses' Plant 1, se se se 9-14n-3e, rig.

Clare County: Taggart's Freer 1, e½ 18-17n-6w, lcn.

Ionia County: H. J. Schrauben's Patrick 1, sw sw ne 4-5n-6w, dr.

Montcalm County: E. C. Dailey's McPherson 1, sw ne nw 14-12n-5w, dr.

Muskegon County: Muskegon Dev.'s Oatman 1, se nw se 3-12n-15w, rig.

Van Buren County: Michahoma's Gannet 1, ne sw sw 36-1s-16w, rig.

MISSISSIPPI

Issaquena County: Sun's Hayes-Johnson 1, c se se 1-9-8, lcn.

Lamar County: Gulf's J. M. Andrews 1, c ne nw 7-1-16, lcn.

Lawrence County: Sinclair Wyoming Oil Co.'s J. D. Riley 1, 990 n 990 w fr sec sw 14-9-20, mir.

Jasper County: Gulf's S. E. Dantzler 1, c ne se 36-1-13, 4 mi e Heidelberg, lcn.

Sinclair Wyoming Oil Co.'s W. H. Clayton 1, 660 n 660 e fr swc se ne 1-1-12, lcn.

Rogers Lacy-T. F. Hodge's Minnie E. Gatlin 1, 660 n 510 e fr swc ne 35-9-9, lcn.

MISSISSIPPI

Warren County: Magnolia's H. D. Ragsdale 1, 780 e wl 330 s nl sw sw 24-16-4, lcn.

OKLAHOMA

Cimarron County: Stanolind's Schonwald 1, se sw 21-3n-8e, lcn.

Creek County: Haddock's Sarnie 1, ne sw se 11-18n-9e, dr 385 ft.

Jefferson County: Sohio's Ridgeway 1, sw ne se 17-3s-4w, spud.

Lincoln County: Herndon Drlg.'s Orr 1, sw ne 11-13n-2e, lcn.

Stephens Inc.'s Hardesty 1, se se nw 20-17n-4e, rig.

Pawnee County: Continental's Feaster 1, sw sw sw 4-22n-4e, lcn.

Stephens County: Carter's Frensley 1, ne ne 12-1n-6w, lcn.

Texas Co.'s Bateman 1, sw nw ne 21-2n-8w, lcn.

EAST TEXAS

Navarro County: Ted Weiner et al's H. C. Redford 1, 468 ft snl 950 ft fr swl 40-ac tr, 3200 ft fr sel 12,500 ft fr swl Hiram Bush sur, 2 mi e Kerens, lcn 3600-ft Woodbine test.

EAST TEXAS BORDER COUNTIES

Harrison County: Stanolind-Continental's James Harris 1, Thomas Gray sur, 6500-ft test, Woodlawn area, 8 mi ne Marshall, ru.

Panola County: Skelly's Houston Wills 1, M. A. Romero sur, 12 mi w of Carthage, lcn.

Columbia Carbon Co.'s Julia Baldwin 1, George Glass Heirs sur, 3 mi n Tenaha, lcn.

SOUTH CENTRAL TEXAS

Bastrop County: Klein & Mills et al's M. Walker 1, 600 fr e 900 fr nl 85-ac tr, G. J. Glassock sur elev 441 ft, lcn 3000-ft test.

Gonzales County: W. V. Hardin's S. T. Robinson 1, 660 fr sel 3300 fr nel 557-ac lse, J. T. Smith sur, lcn 7000-ft test.

Maguires Industries' R. C. Greer 1, 330 fr n&el lse, Richard Bibb sur, lcn 2800-ft test.

LOWER TEXAS COAST

Bee County: Navarro's E. J. Spielhagen 1, 467 fr nw&swl 140-ac lse, John Pace sur, lcn 8000-ft test.

Brooks County: Sun's J. D. Page 6, 1980 fr wl 467 fr nl TM RR sur 665 3250 fr wl 23,219-ac lse, elev 198 ft, lcn 7500-ft test.

Dewitt County: Standard of Ohio's Andrew Kozek 1, 330 fr se&swl 85.96-ac lse, L. Y. Criswell sur, lcn 8900-ft test.

Jim Wells County: Jay Simmons' Rand Morgan 1, 2772 fr e 578 fr nl 361.5-ac lse, Frederick Franks sur 151, elev 94 ft, lcn 5700-ft test.

Live Oak County: Smith & Storey's W. H. Kline 1, 330 fr nw 330 fr swl 80-ac lse, J. McMullen Gr, lcn 4250-ft test.

Argo Oil Corp's T. M. Brookshire 1, 375 fr nw&nel 40-ac lse 990 fr sel unit, J. Poitevent sur 75, lcn 4100-ft test.

Refugio County: J. C. Wynne et al's J. Zarsky 1, 467 fr n&el 85-ac lse, Antonio de la Vina sur 3, lcn 6500-ft test.

Victoria County: Lyons & Prentiss' Keeran Est. 1, 330 fr nw&swl 160-ac tr, Martin de Leon sur, lcn 7000-ft test.

SOUTHWEST TEXAS

Duval County: M. E. Davis' L. G. Denman 1, Santos Garcia Gr A-1985, 1230 fr nl 6000 fr el blk 20, Realitos subdvn, lcn.

Tom Graham's M. I. Richardson 2, 1320 fr sl 1650 fr wl Richardson lse and GB&CNG sur 3, lcn.

John T. O'Neil's Clara Driscoll 1, 330 fr sl 1980 fr el sect 56, Santa Rosalia Rafael Ramirez sur A-478, lcn.

Starr County: Titanic Oil Co.'s Anna M. Kelsey 1, 1050 e of common line between porc 86-87, 950 n of sl blk 5, 330 fr n&el of 40-ac tr, lcn 2700-ft test.

Webb County: Magnolia's Garcia-Arriba 4, 3450 fr el 330 fr sl 2654.25-ac lse, J. James subdvn, Albercas de Arriba Gr, lcn 5400-ft test.

TEXAS GULF COAST

Brazoria County: E. Cockrell's Seaburn Est. Heirs 2, 1166 fr el 6728 fr nly nl 2757.22-ac lse, J. E. Groce 5 Lge, lcn 5000-ft test.

Liberty County: Texas Co.'s G. E. Moore et al 1, start ec Malinda Whittington sur A-398 go nw alg el 4450 th 660 sw at ra 2118-72-ac lse, lcn 10,000-ft test.

TEXAS PANHANDLE

Sherman County: Phillips' J. H. Boney 1, 2588 ft nsl 2749 ft ewl GH&H Ry. 26, blk 2, lcn.

NORTH TEXAS

Archer County: Staley Oil Co.'s H. Harrison 1, 450 ft snl 1500 ft ewl sec 7, blk 5, Clark-Plumb sur, lcn 1150-ft test.

Cooke County: G. E. Kadane & Sons' G. C. Cartwright 1, 330 ft out swc of blk 3-A, B. J. Thompson sur A-1006, lcn 2000-ft rotary test.

Northern Ordnance's Nennie Adams 1, 380 ft snl 1020 ft wel Joseph Burden sur A-114, 4½ mi s Burns City, lcn 5000-ft Ellenburger test.

Jack County: Continental's W. L. Risch 1, 330 ft out sec sec 13, blk 2, Henderson CSL Sur, lcn 6500-ft test.

Hanlon & Buchanan-Greggtex Gasoline Corp.'s Dorcas Hensley 1, 1650 ft ewl and 3187 ft snl of Thomas Martinez sur A-386, lcn 6000-ft Ellenburger test.

Wilbarger County: W. R. Bourland et al's

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W. S. Lundy 1, 330 ft out of nec H&TC 69, blk 12, 2¾ mi nw Oklaunion, lcn 3000-ft rotary test.

WEST TEXAS

Crane County: Magnolia's O. Z. Flood-State 1, 660 ft nw & sw at ra fr s cor H&TC Ry. 12, blk 3, but in H&TC Ry. 20, blk 3, lcn 6500-ft Ellenburger test.

Mitchell County: Magnolia's Mary Foster 22, new pay test 2009 ft snl 2006 ft ewl T&P Ry. 17, blk 29, T-1-S, lcn 9000-ft Ellenburger test.

Pecos County: Magnolia's C. A. Hart-State 1, 660 ft fr nw & swl of 80-ac lse, and H&TC Ry. 8, blk 3, lcn Ellenburger test.

Upton County: Humble's J. M. Parrott 1, c se se E. L. & RR Co. sec 3, east part county, lcn Ellenburger 11,000-ft test.

WEST CENTRAL TEXAS

Brown County: Cordus & Messer's L. W. Boyd 1, 500 ft snl 4100 ft wel of Thoas, Pratt sur No. 107, lcn 1000-ft cable test.

Jones County: Great Lakes Carbon Corp.'s Ramsey Bros. 1, 1650 ft nsl 330 ft wel T&P Ry. 79, blk 14, lcn 2200-ft cable test.

Mills County: Dr. Emil Ott et al's B. H. Yeager 1, 768 ft nsl 3728 ft ewl Caldwell CSL sur No. 112, lcn Ellenburger test.

WYOMING

Fremont County: Sinclair Wyoming's State 1, nw sw nw 18-28n-92w, Crooks Gap, mim Tensleep test.

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Squeaks from the Bull Wheel

Inspired

"How do you know my wife entertained other men while I was out of town?"

"If you promise not to shoot me, I'll tell!"

The Record

The army doctor was questioning the new nurse about a soldier patient: "Have you kept a chart on his progress?"

The nurse blushingly replied: "No, but I can show you my diary!"

Canny Medico

"I want you to vaccinate me where it won't show."

"Okay, my fee is 10 bucks in advance."

"Why in advance?"

"Because I often weaken and don't charge anything."

Kind Contribution

"I'm knitting something to make the sailors happy."

"A sweater?"

"No, a bathing suit for me."

Juth What He Thaid

When a reporter turned in a story about a farmer's loss of 2025 pigs by theft, a copyreader thought the figure high and phoned the farmer to check up on it. "Did you lose 2025 pigs?" he asked. And, when the distraught farmer answered "Yeth," the newspaper thanked him and changed the copy to make the loss two sows and 25 pigs.

Postwar Delivery

A salesman had joined the Army, gone into action, been wounded. For several days he lay delirious, but eventually he turned the corner. On the first day of his recovery he was surprised to see all the nurses standing 'round his bed, offering him money.

"What's this for?" he asked.

"Why, for the radios and refrigerators you sold us while you were unconscious."

Extra Round

"Well, and what excuse have you got to offer for coming home at this unearthly hour?"

"It was like this, my dear. I was playing golf with some friends and—"

"Playing golf! Are you trying to tell me you can play golf in the dark?"

"Oh, yes, that's easy, my dear. You see, we were using the night clubs."

Chance for Another Lincoln

An employer out in Omaha employing three assistants, has been found who has no labor problem. His business is not affected by labor legislation, unions, the Selective Service Act, Social Security or workmen's compensation. He runs a ventilator, chimney and cooling-system cleaner business and his assistants, whose job it is to carry ropes and lines through narrow and twisting passages all day long, consist of two monkeys and a baboon.

If he had eight they would have to join a union.

Pretty Cat

"I suppose your fiance didn't tell you he was formerly engaged to me?"

"No, dear, but every man has something shady in his past."

Trapped

Browser: "I'm sorry to keep you waiting, but I've been setting a trap for my wife."

Wowser: "Good Heavens man, that's too bad. Who do you suspect?"

Browser: "A mouse in the kitchen."

Silly Business

"So you're from the sheriff's office?"

"Oh, you saw the badge on my shirt."

"Why, you haven't got a shirt on."

"So that's why it hurt when I pinned it on!"

Little Helper

One of those starry-eyed female do-gooders was filling in at a USO booth in a railroad station when an excited G.I. bustled up.

"Hey, sister," he rattled off, "I gotta buy a ticket, say goodbye to a couple of friends, get my baggage and eat my lunch and my train leaves in five minutes. Could you help me out?"

"Oh, yes, yes," muttered the starry-eyed one. "You go ahead with the other things. I'll eat the lunch."

Expert Opinion

"I see that a man who speaks six languages has just married a woman who speaks three."

"That seems to be about the right handicap."

New Maps of Lost Soldier Oil Field Area Announced

The Geological Survey has announced the publication of maps showing the structural geology of the Lost Soldier oil field in Sweetwater County, and the areal and structural geology of the Lance Creed field in Niobrar County, Wyoming.

The Lost Soldier map covers an area 10 square miles, 35 miles north-northwest of Rawlins, showing the wells that have been drilled to the Tensleep sandstone up to April 5, last, and including a columnar section of the rocks, ranging in age from Cretaceous to pre-Cambrian. The sub-surface structure of the field is shown by contour lines drawn at intervals of 500 feet on the top of the Tensleep sandstone, which indicate structural closure of about 3000 feet in that formation. Copies may be obtained from the Geological Survey in Washington or its Denver or Casper offices.

The Lance Creek map covers an area of 975 square miles, showing the structure by contour lines and by two structure sections, together with a columnar section showing rocks ranging in age from Tertiary to pre-Cambrian. Copies may be obtained from the Washington office, at 50 cents each.

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Wherever dry gas fueled engines are in service in the oil fields, you'll find Marvel Mystery Oil and the Marvel Inverse Oiler in service. For, Marvel Mystery Oil heads off the gumming that causes valve and ring sticking and when it is proportioned to the engine by the ingenious Marvel Inverse Oiler it assures vital top cylinder lubrication.

In high heat engine combustion areas, where ordinary lubricants break down, Marvel Mystery Oil sustains its remarkable efficiency. Ask us to show you how this specially compounded, detergent, high film strength lubricant combats the motor killing effects of the residues of fuel combustion. Used in connection with the Marvel Inverse Oiler, it provides an auxiliary system of top-cylinder lubrication that protects vital parts, extends motor life and improves performance. Ask for the facts. Emerol Manufacturing Co., 242 W. 69th St., New York.

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Economize with JENSEN Units

How to pump wells more profitably has been our problem for 25 years. We have found many of the answers.

We can now say from long experience that any well is likely to be more profitable and satisfactory when equipped with a JENSEN Pumping Unit.

And you can check that statement easily. Talk with owners—many of whom have used other pumping equipment in direct comparison with JENSEN Units while working with us to improve our product. It is doubtful if any manufacturer has ever had so much enthusiastic co-operation from successful field men as we have enjoyed for so many years.

Talk with dealers. See our Composite Catalog pages. Write us for Bulletin No. 27.

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Some of the many items available for rent are shown in the accompanying picture, ready for immediate use.

Sawyer's
PROTECTIVE WORK CLOTHING

The Frog Brand trademark has long stood for the best protective work clothing for the man who must work in damp or wet conditions. Though now enlisted in the War Effort, Sawyer is already studying methods, materials and the requirements of post-war industry so that Sawyer's Protective Clothing bearing the Frog Brand will continue to lead the way in its field.

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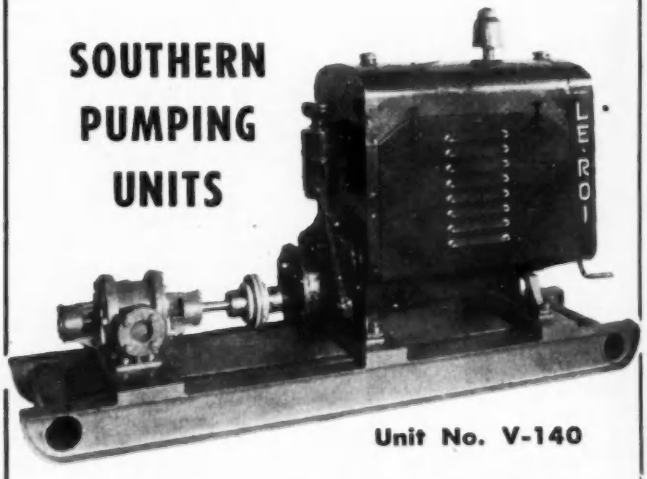

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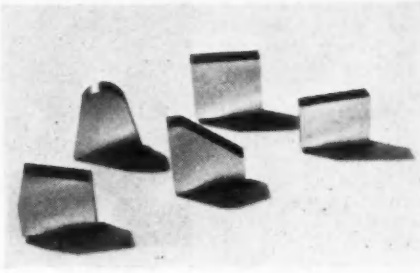
Notes for the Equipment Buyer and User

Cast Tool Tips

HAYNES-STELLITE COMPANY

Haynes Stellite Company, Kokomo, Indiana, is offering tool tips cast from cobalt - chromium - tungsten alloy, for shops desiring to fabricate their own metal-cutting tools. Metal-cutting tools made by brazing these tips to steel shanks are recommended for jobs employing tools of large cross-sections or tools that are bent or offset, or in tool holders which make the use of solid tools impractical. Tipped tools also offer an additional advantage on operations that necessitate considerable overhand of the tool.

Ten standard shapes of tool tips are available. Each has the joint faces bronze-tinned for brazing. Standard tips can also be furnished without the bronze coating, if desired.



Haynes Stellite Cast Tool Tips

Pipe Plant at Tulsa Specializes in Floods

Bradford Pipe Cement Lining Company has opened a plant in premises formerly occupied by Wertzberger Derrick Company at Tulsa and is specializing in water-flood and salt-water disposal-system installations. Morris Fell is manager of the plant.

Jack Smith Going South For Byron Jackson Company

The Oil Tool Division of Byron Jackson Company, Los Angeles, announces departure of Jack Smith, foreign representative, for a visit to the oil-producing countries of South and Central America. His trip will include Mexico, Venezuela, Ecuador, Peru, Colombia and Trinidad, B.W.I., and will require about two months. On his return he will contact all the foreign operations offices with regard to the things of interest he has learned as a result of his trip.

Jack Smith

Henderson Directing Sales For Western Gear Works

Western Gear Works, Lynwood, California, has named Glenn E. Henderson to direct sales and servicing of oil-field equipment made by the company. During the past 90 days, he has been devoting his full time to an intensive study of production methods of manufacturing and engineering of pumping units in the Lynwood plant. He has been in the sales division of Western Gear Works for several years, and has been associated with the oil industry in California for the past 24 years.

W. G. Corey, who formerly held the position which Henderson assumes, has opened offices as a consulting engineer.

G. E. Henderson

New Tool Rental Service Opened at Houston

Merrill-Stone Company is the name of a new oil-field tool rental service organization at 773 McCarty Street, Houston, Texas, owned by Earl L. Stone and R. L. (Bob) Merrill. For the time being the company will operate a general tool rental business, but later a drilling service is to be added. Both owners are familiar with oil-field problems, having spent many years in oil field activities throughout the Gulf Coast.

Oil Center Tool Company Has Sales Meet at Houston

A recent three-day meeting of the sales personnel of Oil Center Tool Company, Houston, brought together the following members of the staff: Allen Cochrum, I. C. Wells, A. J. Penick, R. W. Elliott, H. D. Start, J. E. Edwards, Blake V. Fisher, Walter Burke and J. W. Cummings.

Prichard New Kobe West Texas Manager

John Prichard has been appointed district manager in charge of West Texas operations by Kobe, Incorporated, Huntington Park, California. Prichard, who will make his headquarters at Odessa, is a graduate of the University of Oklahoma and joined the Kobe organization in 1940. He was advanced to district representative in Oklahoma City in 1941 and a year later was transferred to Illinois as district manager. In 1943 he held the same position in the com-

John Pritchard

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ROPE CONSERVATION NOTE BOOK—

AVOID UNNECESSARY ABRASION
PAGE 6
When in use, keep rope off the ground as much as possible. Dragging it over rocks and gravel will cut the outer fibres. Pulling it through sand picks up grit which works into the rope and causes wearing and abrading of the inner fibres.
When rope must be dragged over such surfaces as cleats, pulleys or winchheads be sure those surfaces are smooth.
For further information on treatment of rope write for booklet "Care and Conservation of Rope"

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Mills: New Bedford, Massachusetts

5980

pany's Kansas-Nebraska territory where he remained in charge of operations until his appointment to West Texas.

Muratta Sales Manager for Deckard Manufacturing Company

S. C. Muratta

Deckard Manufacturing Company, Tulsa, announces that S. C. Muratta has joined the company as sales manager. He will have headquarters in Tulsa, and will supervise sales throughout the oil country. Muratta formerly was connected with United Iron Works Company and was later in the steel business in a sales capacity in Oklahoma City.

Union Wire Rope Gets Added War Recognition

Union Wire Rope Corporation, Kansas City, Missouri, was awarded the fourth renewal of the Army-Navy E recently at the Kansas City plant. In view of the record achieved by the company, the Army and Navy awarded the flag for a period of one year, although six months is the ordinary renewal period.

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New Printing (1944)

POSSIBLE FUTURE OIL PROVINCES of the UNITED STATES AND CANADA

•

Edited by A. I. LEVORSEN

•

The purpose of this symposium is to get an over-all picture of the undiscovered oil resources of North America, north of the Rio Grande. Ten geological organizations have participated, to the end that this survey has behind it the authority of many geologists representing state and national geological surveys, large and small oil companies, and consulting and independent geologists. A map and a section of geology, stratigraphy, and structure illustrate each province description.

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